SEPTEMBER 17, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

Electric Motors

Supplying Muscles For Industrial Expansion

—see page 57

GETTING IN THE SCRAP?
—Join Up by Cleaning Out, p. 55

CUTTING OILS
—Defense Will Take A Lot, p. 56

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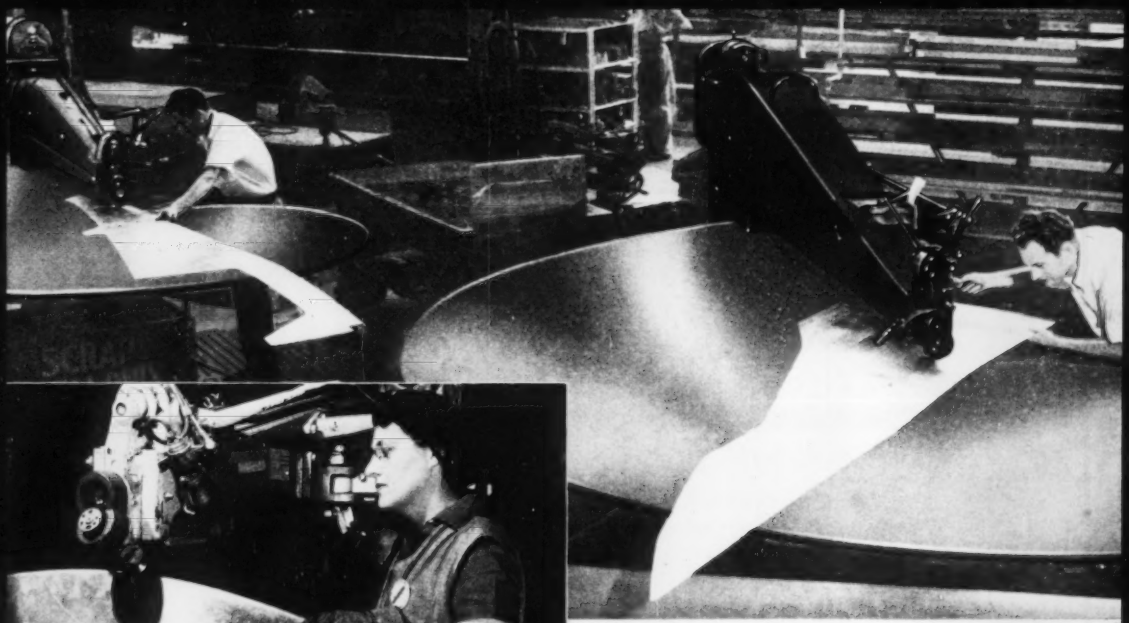
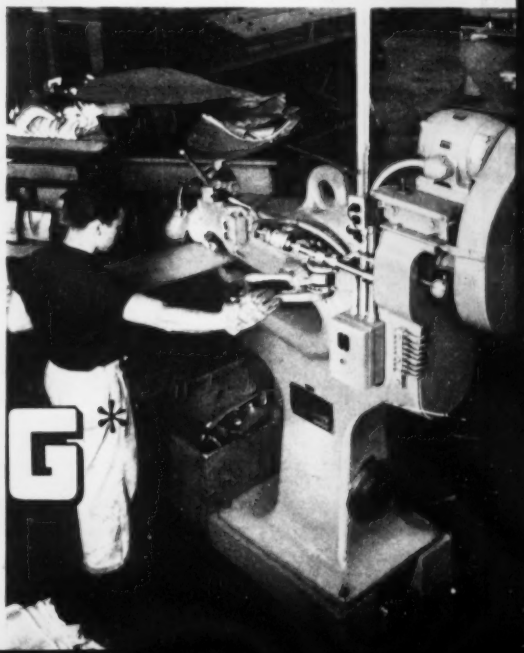
YOUR QUICKWORK IS READY FOR DEFENSE WORK



(Above)
Special Aircraft Forms are cut to exact size on a Quickwork Model 10A Shear.

(Below)
Fast production schedules are maintained in a California aircraft plant with the Quickwork 20A Shear.



● For defense production. Few metal-working machines can serve so many industries or perform such a wide variety of work as the Quickwork-Whiting Rotary Shear. It is practical for special job shopwork or continuous production. It makes straight or curved cuts—slits—circle cuts, bevels, and joggles at high speeds. Available in a wide range of models to handle up to 1" mild steel.

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CORPORATION

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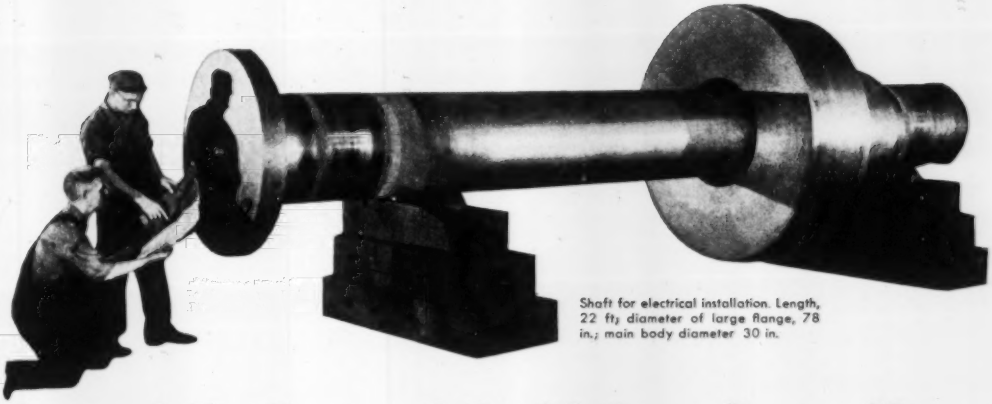
HARVEY, ILLINOIS

*Reg. U. S. Pat. Off.



Shaft for electrical installation. Length, 22 ft; diameter of large flange, 78 in.; main body diameter 30 in.

Typical Products of Bethlehem Forge Shops

Stop-valve casing. Height, 40½ in.; maximum diameter, 34 in.; diameters axial bores, 6½, 12, 15, 23½ in.

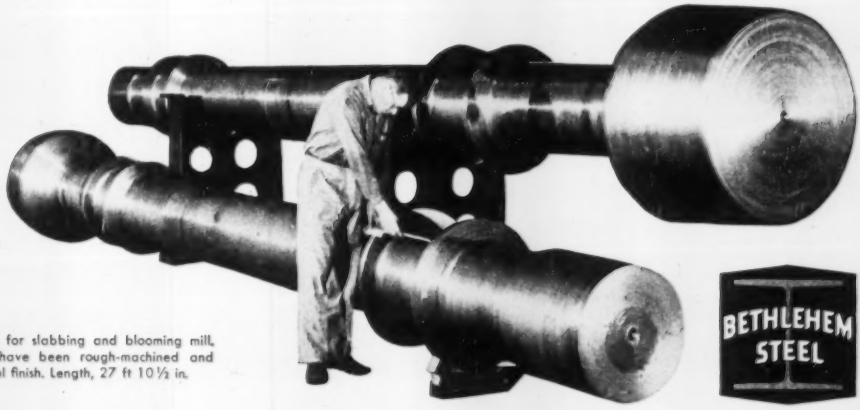
We're showing here some classes of work that Bethlehem handles month after month, year after year, in its well-equipped forge shops. All three jobs are press forgings—typical examples of what Bethlehem can make very easily.

Note the wide difference in weights. The stop-valve casing is a fairly small piece, weighing only 4460 lb. The long spindles weigh approximately 20 tons each. The shaft with the large flange runs better than 58 tons. But despite the greatly-contrasting weights, these forgings by no means represent extremes. We make some that are smaller, some that are much, much larger—real giants.

And of course, to complement its forging facilities, Bethlehem has one of the finest machining set-ups in the industry. Think of Bethlehem in terms of *both* forging and machining—a place where *both* steps can be done to your specifications.

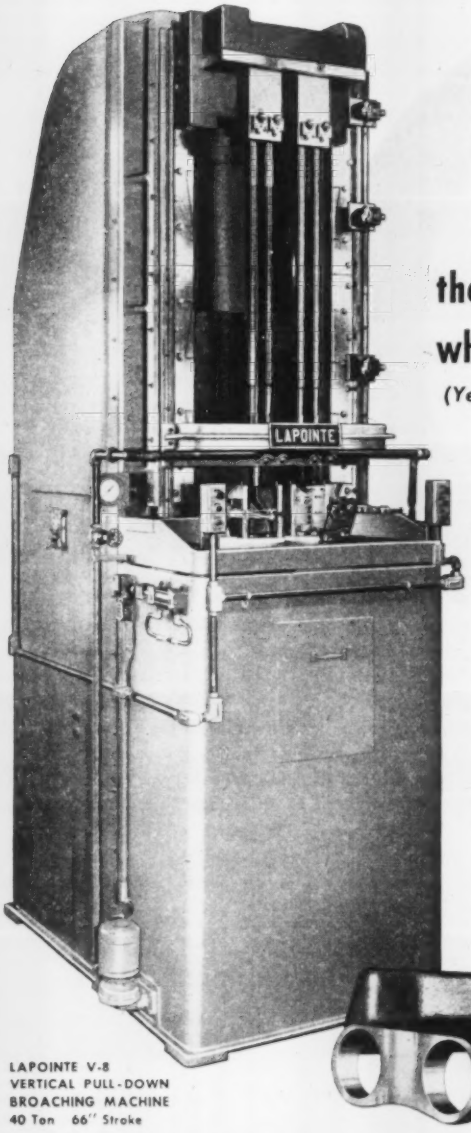
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

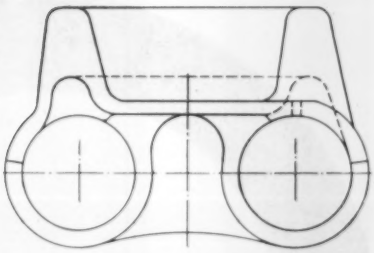


Alloy-steel spindles for slabbing and blooming mill. These two pieces have been rough-machined and given a flatnose-tool finish. Length, 27 ft 10½ in.

BETHLEHEM STEEL



LAPOINTE V-8
VERTICAL PULL-DOWN
BROACHING MACHINE
40 Ton 66" Stroke



there's more money in holes when you broach 'em this way!

(Yes, and more speed and more accuracy, too)

IT'S NO TRICK AT ALL
to broach these 1.873" holes at a rate of 200 complete parts per hour . . . 800 holes . . . on this

LAPOINTE

V-8 VERTICAL PULL-DOWN BROACHING MACHINE

AUTOMATIC BROACH LIFTERS make it unnecessary for the operator to handle the broaches;

BROACHES ARE ROTO-KUT, standard round type, designed with special rear puller for the automatic lifters;

FIXTURES are manually operated, spring clamped.

THIS TANK TRACK SHOE, a chrome vanadium forging, has broached holes with a tolerance ±.0005", and spaced to within .005" center to center. It is another proof of the saying

***YOU CAN BROACH IT BETTER WHEN YOU BROACH IT BY* LAPOINTE!**

Technical data and complete specifications are given in our Bulletin VPD-3

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HUDSON, MASSACHUSETTS • U. S. A.
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HUDSON LAPOINTE MASS

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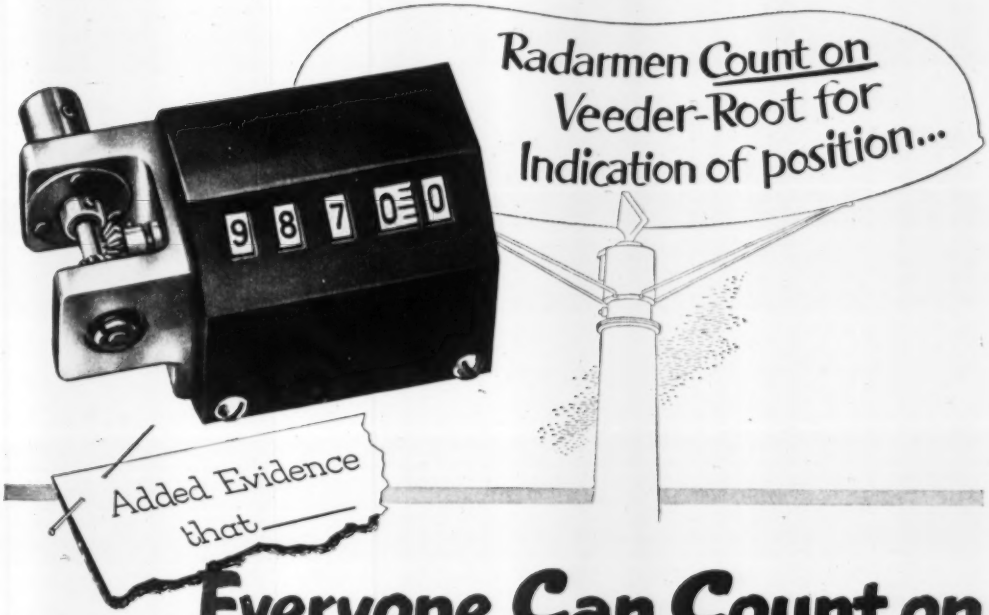
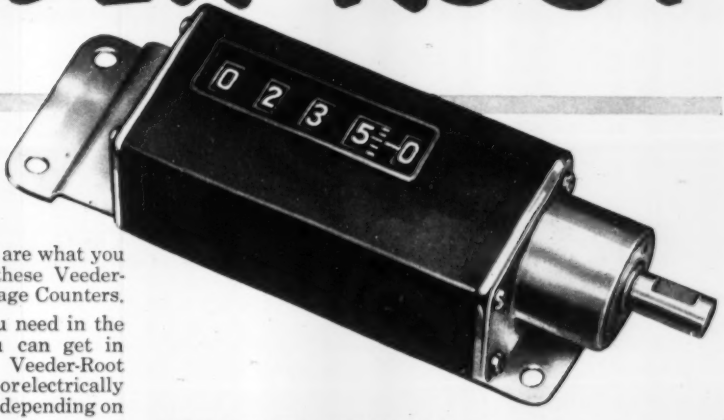


Everyone Can Count on VEEDER-ROOT



LONG-RANGE EYES are what you really have here, in these Veeder-Root High-Speed Yardage Counters.

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The major part of our present production goes into the many thousands of such products made every day under the defense program. We appreciate the patience of our many friends in industry during these critical times and are looking forward to the day when we can again devote our entire output to their requirements.

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STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 12 SEPTEMBER 17, 1951

THIS WEEK IN METALWORKING

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Editorial and Business Staff—Page 10. Advertising Index—Page 180. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week **... Standardization — Key to More for Less ... Jet Plane Production Spurs Unique Machines and Methods ... Press Clips Produce Wrinkle-Free Stampings ... Furnace Loading Methods Facilitate Brass Wire Annealing**

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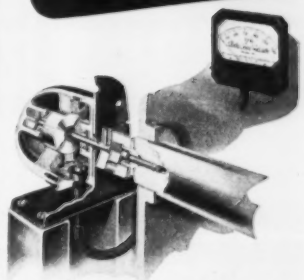

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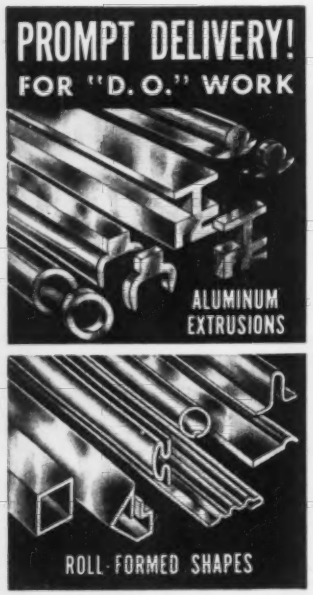

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Behind the Scenes...

Bachelors Speak Up

From the *Bachelors Protective Association News* comes this data on what single men think about women:

	Yes	No	Not Sure
1. Do most women prefer well heeled men rather than those who are merely interesting and intelligent?	723	285	178
2. Do you mind if a woman smokes a cigarette when she is walking along the street with you?	972	214	...
3. Do women have a tendency to telephone men too often and talk too long?	502	542	142
4. Do most women become over possessive as soon as they become engaged?	759	119	308
5. Are you an unconfirmed bachelor who is still looking for the right girl?	878	130	178

Discourse on Fruit Cake

We're relieved to note that holiday fruit cake is exempted from price control. But our relief is tempered by the fact that the move is only temporary. We object to price controls on fruit cake because of complicated childhood associations.

Years ago the fruit cake we received for Christmas lasted for months and months and had for us a connotation of permanence. Even now, whenever we think of fruit cake, we think of something that lasts practically forever. Anything connected with fruit cake has an aura of permanence about it in our mind. We definitely don't want price controls to have that aura of permanence.

No Comment

America's first atomic age department store just opened at Fifth Avenue and 42nd street in New York. There over the counter you can buy sniffers, snoopers, classmasters, cutie-pies and ferrets, as varitype radioactivity detectors are called.

Started and staffed by several former atom bomb scientists, the Radiac Co. exists to suply prospectors, medical doctors, laboratory technicians, civil defense workers, hobbyists and engineers with a variety of atomic instruments needed in their activities.

On Die Casting

For some time, we have been wanting to see "The Shortest Way," a movie produced by Jam Handy for Doehler-Jarvis. D-J's Gene Brissie (uncle of the Cleveland Indians' Lou Brissie) staged a special showing for us a couple of days ago in New York. The movie starts off with the first practical die-casting machine patented by H. H. Doehler in 1904 and now in Smithsonian Institution. The 1904 machine was hand-operated and could cast only alloys of lead and tin. The story carries on through to present-day mechanized production and finishing of zinc, aluminum and magnesium castings, many of exceedingly intricate design. For instance, die castings make possible the automatic auto transmission.

Honesty Pays Off

Tax evasion is so general in France that Americans working there are sometimes given an extra-legal automatic income credit of 30 per cent before the tax rates are applied against them, on the theory that Americans do pay their taxes.

Experiments

A few gimlet-eyed readers have noted in the past few weeks that the editors have been conducting some typographical experiments in the Windows of Washington and Mirrors of Motordom departments that this week start on pages 62 and 69, respectively.

The type on those pages, you'll note, is bigger than the normal body type in the news section. It's 9 point Ideal, set on an 11-point slug, in contrast to the 8 point on 10 normally used. The editors have, and will continue to, run the two departments in the larger type to find out the reaction it gets, to determine how they themselves like it.

Being bigger, it's easier to read but then it also takes up more room and less can be written in the larger size.

Puzzle Corner

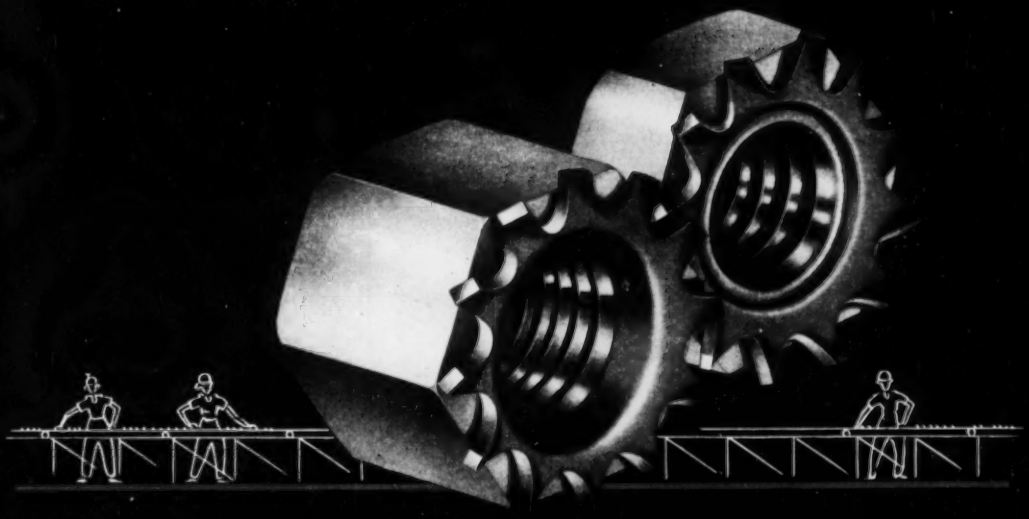
Our dispatch rider in the Sept. 3 problem traveled 966 miles. First in with the correct answer was one of our star puzzle solvers, C. E. Blass of Talon, Inc.

There's an engineer at the front end and a conductor at the rear end of each of two trains which are traveling in opposite directions. Each train travels at the rate of 45 miles per hour, and each is 66 yards long. How many seconds after the two engineers pass each other will the two conductors pass one another?

Shrdlu

(Metalworking Outlook—Page 47)

Where 1+1=1.....



SHARON* STEELS USED IN MANUFACTURE OF NEW COST-CUTTING FASTENER

One lock washer plus one nut used to total up to two separate assembly operations. But that was before KEPS†. Now these two separate parts are handled as a single unit because they are pre-assembled. This cuts costs, speeds production, reduces inventory problems and improves product quality.

Pre-assembling lock washer and nut was a tricky operation. The washer had to be free to rotate on the nut, and not bind on the bolt. The steel used had to have the spring demanded of a lock washer, yet it had to be easy to work to be fastened to the nut. Sharon engineers have supplied the manufacturers of KEPS† with a steel that has met all the necessary requirements.

If you are working with steel it will pay you to know the Sharon representative in your area.

***Specialists in STAINLESS, ALLOY, COLD ROLLED and COATED Strip Steels.**

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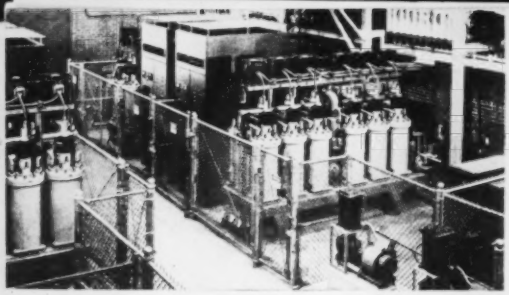
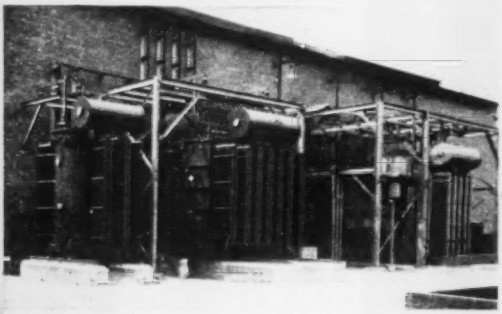
For information on Titanium Developments contact Mallory-Sharon Titanium Corp., Indianapolis 6

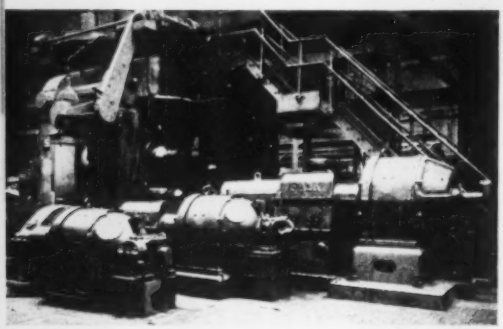
SHARONSTEEL



Interior view of building housing the Allis-Chalmers 16,000 kw mercury arc frequency changer. By-product power—largely generated by Allis-Chalmers steam turbines and gas engines at nearby Gary Steel Works and South Works — is converted from 25 cycles at 23 kv to 1750 volt dc along right side of building. Inverter along left side changes dc to 60 cycles at 6.6 kv linking with the purchased power system.

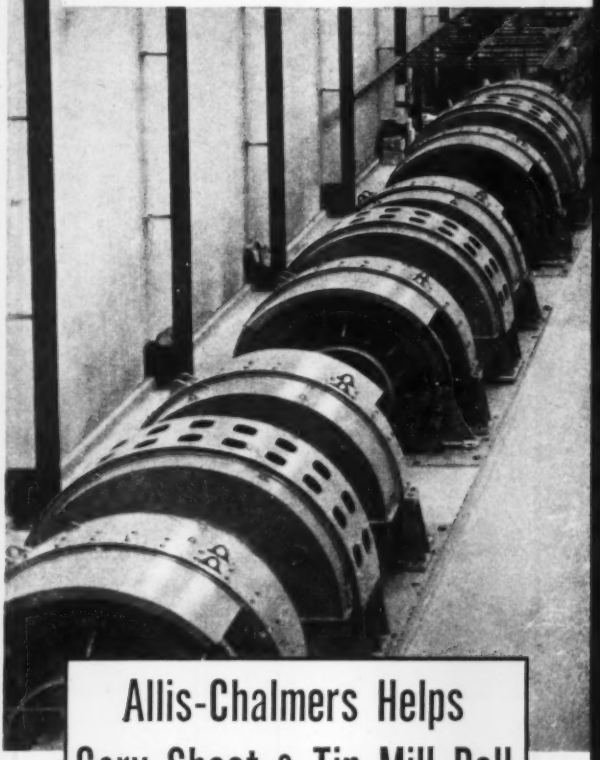


Allis-Chalmers rectifier transformers, reactors and oil circuit breakers serve the 16,000 kw mercury arc frequency changer. Outdoor equipment on the 60 cycle side is seen above. From left to right: dc reactor, 8000 kw self-cooled transformer, 15 kv, 500,000 kva a.c. oil circuit breaker, and 8000 kw self-cooled transformer.



Seen here is a veteran two stand temper pass mill still going strong after 15 years on the job. Allis-Chalmers dc motor drives, supporting synchronous M-G sets, switchgear, and control are employed on one single stand and four two stand tandem temper pass mills doing all the tinplate temper rolling.

15 Year Old Hot Strip Mill



Allis-Chalmers Helps Gary Sheet & Tin Mill Roll 2,377,274 Tons a Year

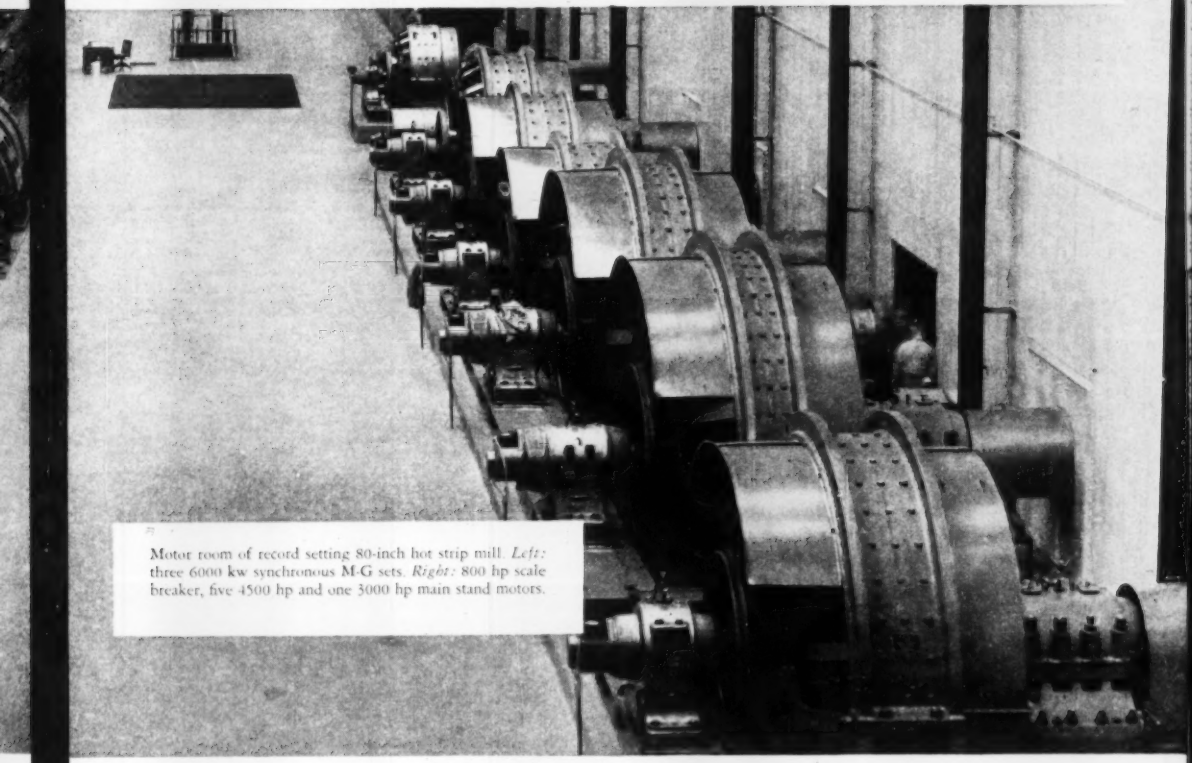
AFTER 15 YEARS IN OPERATION, this 80-inch hot strip mill in 1950 rang up a new annual tonnage world record of 2,377,274 tons! Top 8-hour turn was 4,147 tons. Top month was 222,751 tons. Equipment durability cannot be better demonstrated.

Located at the Gary Sheet and Tin Mill of the United States Steel Company, the mill rolls tough stainless steel as well as strip for regular sheet and tinplate products. Allis-Chalmers supplied the complete electrical equipment driv-

Power, Electrical, Processing Equipment for Iron and Steel

ALLIS-

SETS WORLD TONNAGE RECORD!



Motor room of record setting 80-inch hot strip mill. *Left:* three 6000 kw synchronous M-G sets. *Right:* 800 hp scale breaker, five 4500 hp and one 3000 hp main stand motors.

ing, supporting and controlling this veteran hot strip mill.

Originally installed in 1936, it has since been revamped to meet current demand. But the electrical equipment is still Allis-Chalmers with the original motors, generators and switchgear remaining in operation despite 15 years of punishing shock loads and sustained peak loads!

Allis-Chalmers quality equipment also is displaying durability elsewhere in the Gary Sheet and Tin Mill operation. Five Allis-Chalmers equipped temper mills (lower left) have been in daily operation for 15 years.

First Mercury Pool Frequency Changer

With equipment quality so thoroughly proved, the Gary Sheet and Tin Mill selected Allis-Chalmers to build the first commercial mercury pool type frequency changer in America (upper left). Now in its eighth year, it interchanges power between the 25 cycle system and the 60 cycle purchased power system.

The 16,000 kw electronic frequency changer greatly increases flexibility and economy of operation by permitting full utilization of by-product power and reducing purchased power demand peaks. Other Allis-Chalmers mercury arc rectifiers also are used here to provide 250 volt dc mill supply.

Whatever your needs in electrical equipment for iron and steel production, A-C will supply you with dependable, quality equipment. For specific information on a *complete* range of generation, switching, conversion, rectification, drive, and control equipment . . . call your nearest A-C office or write to Allis-Chalmers, Milwaukee 1, Wis. A-3505

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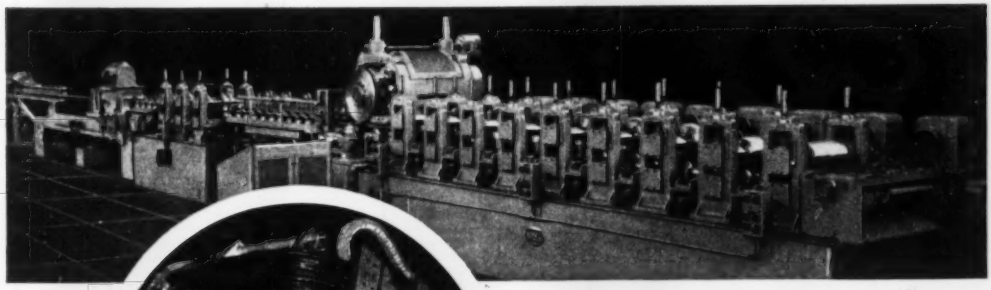
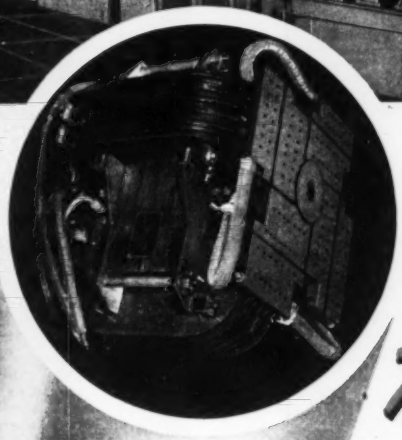




IMPORTANT ADVANCE IN *Tube Welding*

Up to 20% Higher Production

Yoder now announces the greatest forward step in tube welding since the introduction of the first patented Yoder Tube Welder in 1939. The enviable production records established by this welder largely account for the fact that Yoder has furnished more than half of all the resistance-weld tube mills since installed in the U.S.A.

The heart of the new welder is a transformer of revolutionary design. It consists of four smaller transformers surrounding a common core and making an assembly of unprecedented compactness and strength. Reduced impedance accounts for its higher electrical efficiency. It insures longer service life, fewer interruptions for servicing, repairs and maintenance.

Compared with the previous Yoder welder, the production gains may be as high as 20%; compared with other tube welders, the gain may be as high as 50 to 60%. These gains go far toward compensating for increased labor and material costs.

The welder is furnished with all new Yoder tube mills, and is also available for replacing welders in other makes of resistance-weld mills, to step up production and reduce conversion cost.

Descriptive literature, consultations and estimates for the asking.

THE YODER COMPANY • 5502 Walworth Avenue • Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS–cold forming and welding

ENGINEERING YODER MANUFACTURING

WHEELABRATOR®

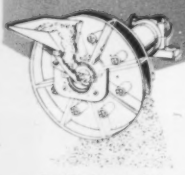
AIRLESS BLAST CLEANING

• CUTS CLEANING TIME 75%

• SAVES $260 PER MONTH IN MAINTENANCE COSTS

CLEANING TOOLS PRIOR TO PLATING

AT AIRCRAFT MECHANICS, INC.
Colorado Springs, Colorado

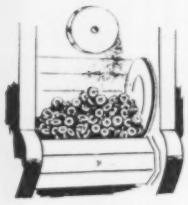


The Wheelabrator Unit

Quantities of tools that formerly required up to two hours cleaning time are now Wheelabrated in from 7 to 30 minutes at the Aircraft Mechanics, Inc. All work is now cleaned in two to four hours a day where previously an eight hour day was not enough and overtime work was often necessary.

With the Wheelabrator Tumblast, "maintenance and repair parts cost is so negligible as to be insignificant." Thus use of the Wheelabrator saved an average of three hours a day and $260.00 a month which had to be expended in keeping the former equipment in working order.

WHEELABRATING HAS MANY EXCLUSIVE ADVANTAGES



The Exclusive Wheelabrator Tumblast Principle

The reason why Wheelabrator Airless Blast Cleaning is saving money for users everywhere can be found in the perfected design of the Wheelabrator Unit. This unit hurls abrasive by centrifugal force in a controlled pattern. It throws more abrasive and throws it harder per horsepower expended than any other blasting device ever conceived.

The exclusive tumbling principle of the Wheelabrator Tumblast cascades the work directly beneath the Wheelabrator Unit which whips a continuous stream of abrasive upon the work the full width of the cleaning chamber. It is the simplicity of this Tumblast design and the absence of complicated mechanisms that keeps maintenance costs to a minimum.

American
WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St., Mishawaka 5, Indiana

LETTERS
TO THE EDITORS

Hearty Concurrence

I was interested in reading STEEL's editorial, "Out of Control," (Aug. 27, p. 39). Apropos of this, my associate has coined this slogan: "Let's stop spending before spending stops us!" He has written his congressman as well as the New York newspapers on this matter, and of the latter, the Daily News and World Telegram & Sun have published his letter.

Norman A. Schuele, advertising manager
Revere Copper & Brass Inc.
New York

We heartily concur on your recent editorial, "Do Your Part," (STEEL, Sept. 3, p. 55) and as suggested, are writing to our Massachusetts congressmen and representative from our district. We are extremely glad to do our small part as suggested in the above editorial.

W. O. Harvey, chairman
Harvey-Whipple Inc.
Springfield, Mass.

Names Stick

Who makes the 0.003-inch adhesive aluminum foil nameplate reported under the heading "Names Stick," (STEEL, Aug. 6, p. 71)?

J. Manuele, director
Headquarters Quality Control
Westinghouse Electric Corp.
Pittsburgh

STEEL reports a new development in name plates. Please advise where we may obtain more data on this subject.

P. M. Heinmiller, vice president
Utility Trailer Mfg. Co.
Los Angeles

• *Write to C & H Supply Co., Metal-Cal Division, Seattle, Wash.*

Amazing System

We are quite interested in STEEL's item, "14,000 Pages on One Stamp." (July 30, p. 63). We would like to know more about the amazing photographic accomplishments and system; also the linear scale, made in lengths up to 2 feet, accurate to within 0.00003-inch in the overall length.

L. H. Ritzma, advertising manager
Ohmite Mfg. Co.
Chicago

• *These are developments of G. E. Elliott, British scientist who recently joined United States Testing Co. Inc., 1415 Park Ave., Hoboken, N. J.*

Search for Suppliers Continues

We manufacture types of oil storage tanks, truck tanks and do sheet metal work. In this regard, we need assistance in getting names of U. S. manufacturers of ¼ and 3/16-inch hot rolled steel plates from 10 gage to 16 gage; hot rolled steel sheets; and galvanized sheets 14 gage and heavier.

S. F. Flagg, manager
Ferro Metal Ltd.
Montreal

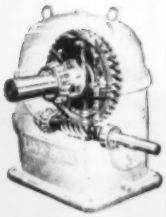
• *This information was carried in detail in STEEL's "Guide for Steel Buyers," (Jan. 15, 1951). On the products named, the Guide gives a listing of thicknesses produced, along with width and length, name of the producing company and location of mills.*

No one speed reducer solves every reduction problem

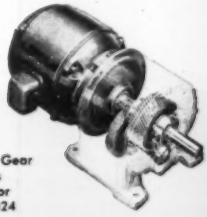
That's why LINK-BELT builds all 3

WHETHER it's a helical, a herringbone or worm gear drive that best fits your needs—you get an unbiased recommendation, an incomparable product from your Link-Belt power transmission engineer.

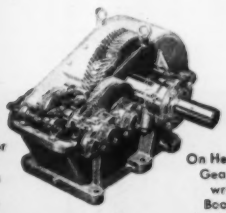
That's why Link-Belt builds all three; has no axe to grind. You can be sure you get the one that suits all your requirements for ratio, space, shaft position, shock loading and many other factors. Precision-engineered for quiet, economical power transmission, all Link-Belt drives will give you long service under the toughest operating conditions.



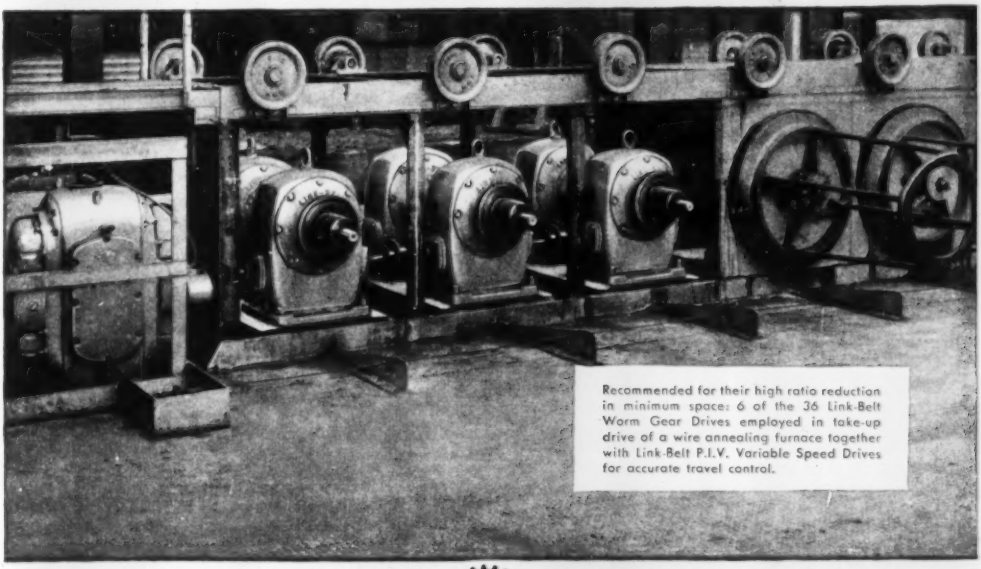
On Worm Gear Drives write for Book 2324



On Gearmotor and Helical Gear Drives write for Book 2247



On Herringbone Gear Drives write for Book 2419



Recommended for their high ratio reduction in minimum space: 6 of the 36 Link-Belt Worm Gear Drives employed in take-up drive of a wire annealing furnace together with Link-Belt P.I.V. Variable Speed Drives for accurate travel control.

LINK-BELT
ENCLOSED GEAR DRIVES

12.238

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities.

Here's what we're doing

about the steel wire situation:

FIRST, of course, we're pushing production to the very limit.

Second, we're working with you, the user, to help you get the most out of the wire you're getting. Here's what we mean:

If you're having steel wire trouble, turn your problem over to our metallurgists. They've tangled with just about every problem in the history of wire fabrication. A problem that is totally new to you, may be a simple matter of recorded history for us.

For example: You may be using a wire that's unsuitable for the job it has to do. Perhaps a different grade can be used that will give the desired performance. Maybe your fabricating techniques can be improved, resulting in more uniform physical properties and less scrap.

You may be able to improve your product and actually cut your costs at the same time. We've seen that happen plenty of times.

In any event, if you have a wire problem, we'll be glad to give you all the help we can. We've always offered this service, but we think it's particularly valuable now.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMERICAN MANUFACTURERS WIRE

AMERFINE—*High-quality fine wire.*

AMERSPRING—*music steel spring wire.*

AMERLOY—*alloy heading wire.*

AMERTEMP—*heavy-duty oil-tempered wire.*

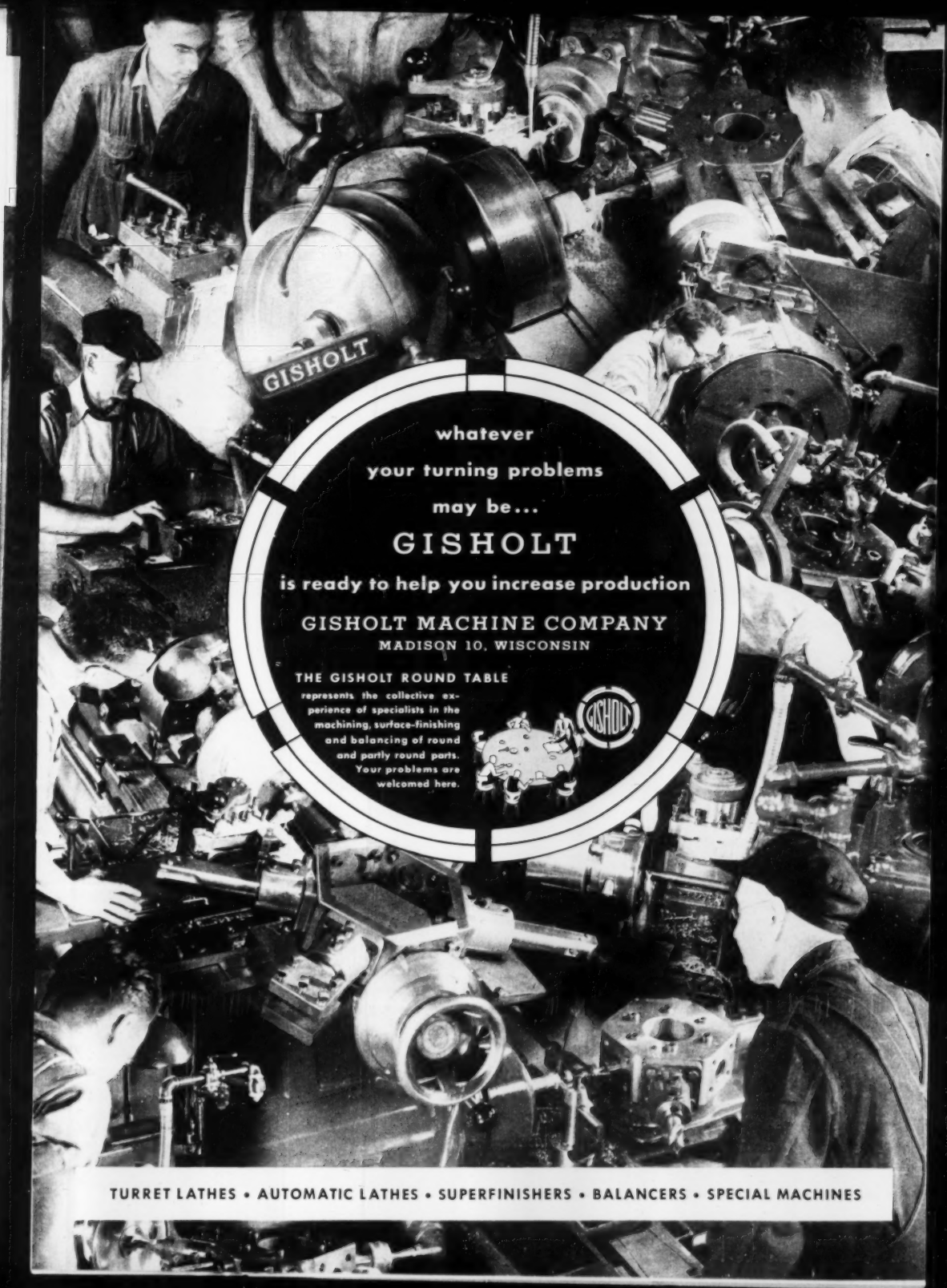
AMERHEAD—*uniform heading wire.*

AMERSTITCH—*extra-tough metal stitching wire*

AMERICAN
MANUFACTURERS WIRE

USS

UNITED STATES STEEL


GISHOLT
whatever
your turning problems
may be...
GISHOLT
is ready to help you increase production
GISHOLT MACHINE COMPANY
MADISON 10, WISCONSIN
THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.
GISHOLT
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

NEW

SHELL INDUSTRIAL

bring greater under extreme

FOR GEARS...

SHELL MACOMA OILS

FOR ENCLOSED GEARS, Shell Macoma Oils solve the problem of extreme pressure lubrication with *seven distinct advantages:*

1. Extreme load carrying capacity . . . remarkable ability to prevent wear and seizure . . . even after long periods under heavy load.

2. Long-lasting oxidation stability . . . plus freedom from sludge formation in the presence of water.

3. Outstanding adhesion . . . maximum protection against rust, and against leakage through worn bearings and seals.

4. Non-corrosive . . . will not cause corrosion of steel or alloy bearings.

5. Non-Foaming . . . Shell Macoma Oils successfully overcome the tendency to foam caused by aeration of oil in the gear chamber.

6. Speedy water separation.

7. Complete stability in storage and in service . . . no tendency to separate, even in extremes of heat and cold.

SHELL

Be sure to get all the facts about these new Shell Macoma Oils. Check the coupon and attach to your letterhead for full information.

Two great new products of

EP LUBRICANTS

safety to gears and bearings
loads and adverse conditions

FOR BEARINGS...

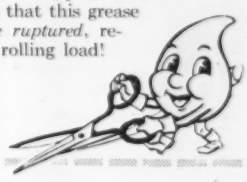
SHELL ALVANIA EP GREASE

FOR GREASE-LUBRICATED bearings, Shell Alvania Grease . . . the one grease that serves *all* grease applications in the majority of plants . . . *now is available with EP qualities added! . . . now even more Multi-Purpose.*

All of these unique advantages of Alvania Grease are therefore available for the first time to operators of machines subject to extreme bearing pressures:

1. **Higher mechanical stability** than any conventional grease at operating temperatures.
2. **Pumpable at low temperatures . . .** even through centralized lubrication systems.
3. **Stable at high temperatures . . .** no phase changes—still a grease at high temperatures—still a grease upon cooling.
4. **Resistant to water . . .** won't wash out.
5. **Longer service life . . .** reduced consumption.

Shell Alvania EP Grease is the answer to some of the toughest lubricating problems in industry. In rolling operations, for example, operators of steel, rubber, plastic and paper mills report that this grease film *just won't be ruptured*, regardless of shock rolling load!



Check the coupon and mail today for additional information about Shell Alvania EP Grease.

Shell Oil Company
50 West 50th Street, New York 20, N. Y.;
or 100 Bush Street, San Francisco 6, Cal.

Please send available data on

☐ Shell Macoma Oils ☐ Shell Alvania EP Grease

Name_____

Company_____

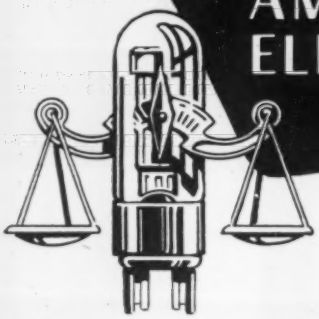
Title_____

Address_____

SHELL OIL COMPANY

Announcing

THE AMETRON ELECTRONIC SCALE



THE NEW WAY TO WEIGH

- **ELECTRIC LOAD CELLS**
- **REMOTE INDICATION**
- **PRINTING RECORDERS**
- **LOW MAINTENANCE**

The Streeter-Amet Company of Chicago announces the new Ametron Electronic Scale. Streeter-Amet engineers, working with the engineers and scientists of the Baldwin-Lima-Hamilton Corporation have created this revolutionary weight determination instrument. By the use of electronic cells this new Ametron Scale will record and print on ticket, tape or even a ledger remote from the scale the exact weight.

Write for brochure explaining the simplicity of construction, the low maintenance and the ease of installation of this new scale.

- Crane Scales
- Remote Indicators
- Truck Scales
- Railway Scales
- Heavy Industrial Scales

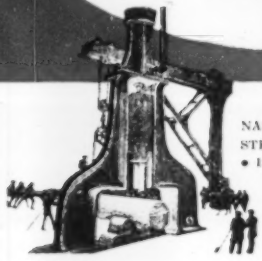
STREETER-AMET COMPANY

4101 RAVENSWOOD AVE. CHICAGO 13, ILLINOIS

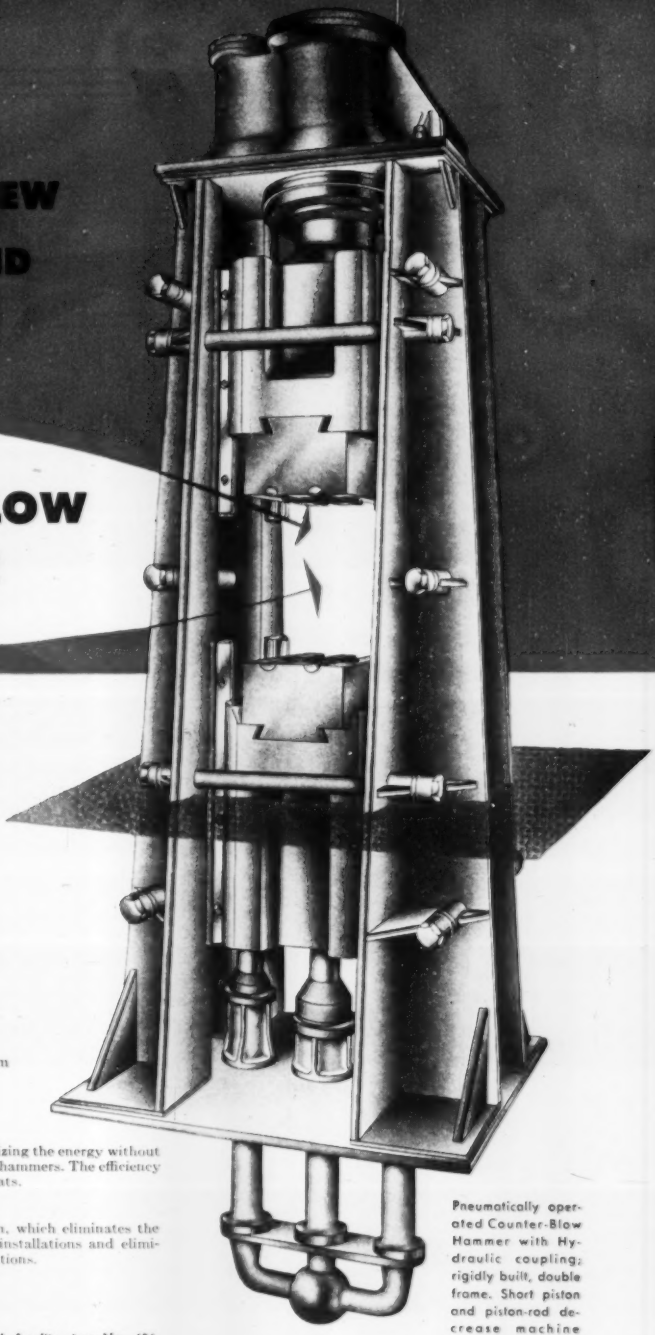
Branches in Pittsburgh, Pa. and Birmingham, Ala.

A POWERFUL NEW PRODUCTION AID

COUNTER-BLOW HAMMER



NASMYTH'S
STEAM HAMMER
• 1843



Pneumatically operated Counter-Blow Hammer with Hydraulic coupling; rigidly built, double frame. Short piston and piston-rod decrease machine height, permit exact alignment; are less subject to rupture.

FOR CHEAPER AND FASTER MANUFACTURE OF HEAVIER AND MORE COMPLICATED FERROUS AND NON-FERROUS FORGINGS OF HIGH METALLURGICAL QUALITIES.

- simultaneously penetrates into the part from both sides, concentrating kinetic energy and enabling formation of intricate and protruding shapes to close tolerances.

- permits shock absorption in the forging, utilizing the energy without anvil loss experienced in conventional drop hammers. The efficiency of the counter-acting strokes saves additional heats.

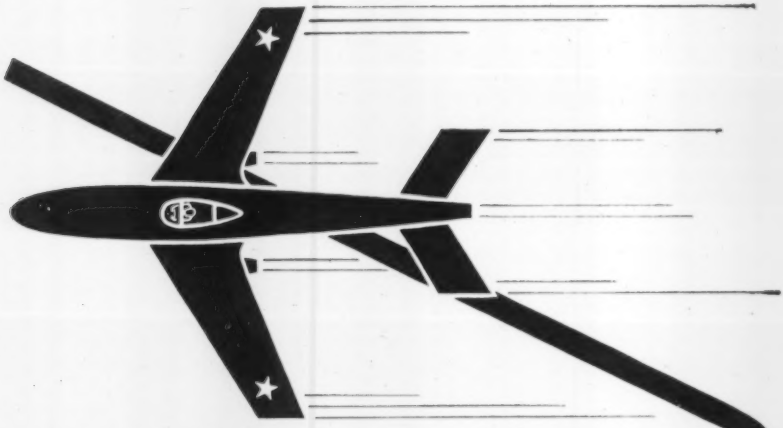
- does not transmit shocks to the foundation, which eliminates the destructive effect on shock-sensitive shop installations and eliminates the necessity for conventional deep foundations.

BUILT IN COOPERATION WITH HYDROPRESS, INC., NEW YORK, BY

Ask for literature No. 606

LOEWY CONSTRUCTION CO., INC.

216 EAST 49th STREET. NEW YORK 17, N. Y.



TUF-STUF'S best proving ground is in the air!

It pays to specify *TUF-STUF* aluminum bronze alloys for parts that must stand up

● Because they are both light and tough, TUF-STUF aluminum bronze alloys have proven invaluable in America's aircraft as valve-seat inserts, spark plug inserts, valve guides, gears and other vital parts.

If your product requires machined parts that are strong but light, resistant to corrosion, long wearing and resistant to oxidation even at high temperatures, then TUF-STUF is the right alloy for the job.

TUF STUF alloys are furnished in the form of forgings, rods and screw machine parts. They fill Federal Specification QQ-B-666, Grade B, and several other variations. Because of the increased use and demand for both aluminum and copper, jobs carrying a Defense Order Number are receiving first consideration.

MUELLER BRASS CO.

PORT HURON 19, MICHIGAN

61

Why EVERY plant needs DoALL Gage Blocks

DoALL Gage Blocks measure in *millionths*. Does every plant need such accuracy?

YES — to control tenths and thousandths. The Tool and Gage Makers Tolerance Chart reveals that to produce a shaft to 1.000 ± .005″ tolerance:

1. The *Working Gage* at the machine must be accurate to ± .0005″, ten times that of the part.

2. The *Inspector's Gage* must be accurate to ±.00005″, ten times that of the working gage.

3. The *Master Gage* which checks the inspector's gage must be ten times more accurate or ± .000005″.

There is your requirement for *millionths accuracy* — and with it you'll cut rejects to the vanishing point.

This kind of accuracy is not a luxury. DoALL Gage Blocks are economical, long-lived *working tools* for checking not only other gages but finished parts as well.

For example, with a set of 83 DoALL Gage Blocks and several accessory pieces you can make *120,000 different snap gages for about 1/4 cent each!* And these are gages accurate to millionths, with dimensional stability that keeps them accurate.

Ask to have a DEMONSTRATION of DoALL Gage Blocks in your plant. There are none finer. See for yourself. Call your local DoALL Sales Service Store or write:

THE DoALL COMPANY
254 N. Laurel Ave., Des Plaines, Ill.

WRITE FOR LITERATURE and ask about DoALL Gage Block CALIBRATION SERVICE that assures you of faithful accuracy.

INDUSTRY'S NEW TOOLS

DoALL

27 SALES-SERVICE STORES

GB-1

Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplies

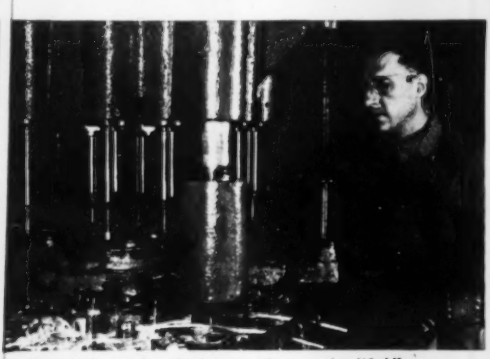
HOW TO GET THE MOST OUT OF THE

"lean alloys do the job when we use U·S·S Improved Heat Treatment*"

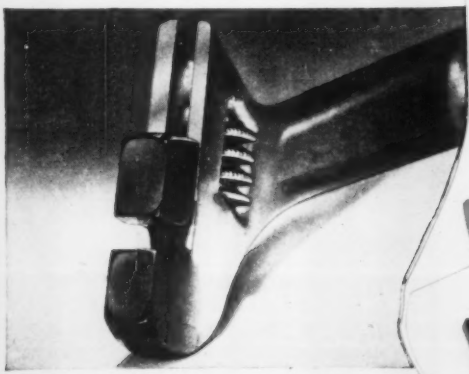
says C. E. WILDERMAN,
Vice President, Tool Division, Utica Drop Forge & Tool Corp., Utica, N. Y.

*available without charge

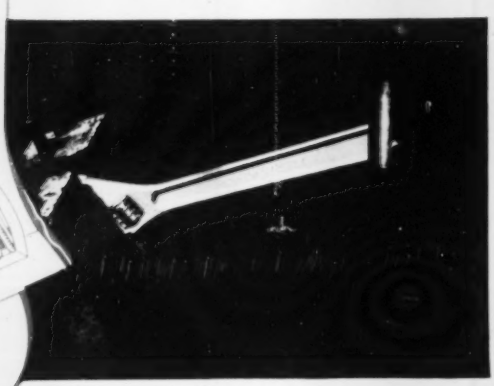
". . . lean alloys forge easier than high alloys, so we get longer die life."



". . . drilling and machining operations are simplified."

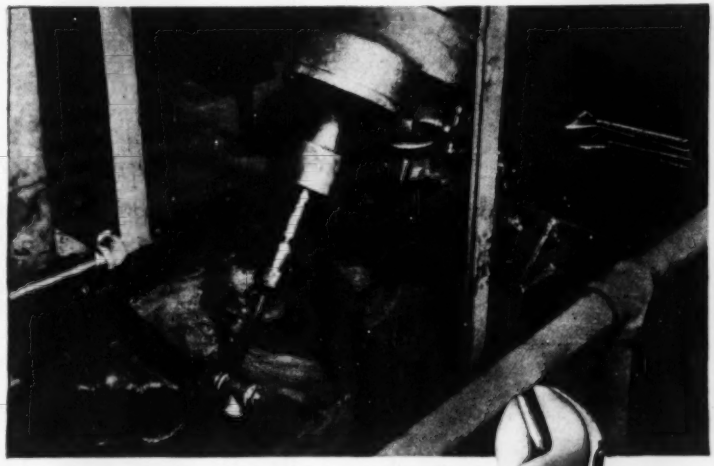


". . . working faces are easily induction hardened." Notice dark sections on jaw faces.

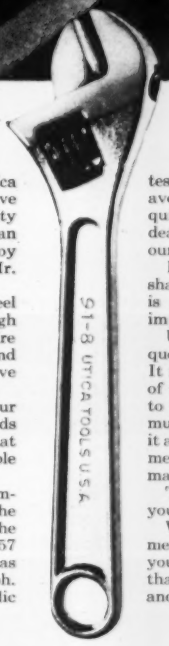


". . . torque tests average 25,000 in. lbs. against 7,680 in. lbs. required by Federal Specifications."

LEAN ALLOY STEEL YOU'RE GETTING



U·S·S Improved Heat Treatment is an improved method of quenching and tempering by means of violent agitation of the quenching bath. The basic engineering principles involve quench tank design; and the definite size, number, placement and powering of the propellers.



BY USING U·S·S IMPROVED HEAT TREATMENT, the Utica Drop Forge & Tool Corp. find they easily achieve the great strength demanded in their high quality adjustable-end wrenches with a medium carbon lean alloy grade of Carilloy steel. The use of a lean alloy in turn means several extra advantages. But let Mr. Wilderman tell the story:

"We have 3 big reasons for using a lean alloy steel for our wrenches. 1) It forges easier than the high alloys, so we get longer die life. 2) Lean alloys require shorter annealing cycles and 3) Our drilling and machining operations are simplified and we have lower perishable tool cost.

"Using U·S·S Improved Heat Treatment, our metallurgists have developed heat treating methods that enable us to get results with lean alloys that are equal to or even better than those obtainable with the high alloys.

"In our operation, the wrench is hardened and tempered to a uniform 44/46 Rockwell "C" scale with the aid of U·S·S Improved Heat Treatment. Then the working faces are easily induction-hardened to 55/57 Rockwell "C" scale. The induction-hardened areas are shown by the dark sections on the photograph.

"Daily control tests conducted on the hydraulic testing machine shows results (for the 12" wrench) averaging 25,000 in. lbs. against 7,650 in. lbs. required by Federal Specifications. We think a good deal of the credit for these torque ratings is due to our U·S·S Improved Heat Treatment."

If you are having heat treating difficulties, keep a sharp eye on *quenching* methods. Proper quenching is often just as important—sometimes even more important than the steel or the heating.

U·S·S Improved Heat Treatment is a superior quenching method developed by United States Steel. It removes heat quickly and evenly from every part of the material's surface. Elapsed time from quench to tempering treatment is held to an absolute minimum. This not only improves mechanical properties; it also reduces cracking. Furthermore, this quenching method improves machineability by minimizing formation of free ferrite in hypo-eutectoid steels.

The use of this quenching process is available to you without charge.

We do not manufacture or sell heat treating equipment, but our metallurgists will be glad to analyze your heat treating methods and make suggestions that may give you more uniform hardness, less rejects and less re-treatments.

UNITED STATES STEEL COMPANY, PITTSBURGH • COLUMBIA STEEL COMPANY, SAN FRANCISCO • TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM

UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

Carilloy Steels

ELECTRIC FURNACE OR OPEN HEARTH • COMPLETE PRODUCTION FACILITIES IN CHICAGO AND PITTSBURGH

1-1127

UNITED STATES STEEL

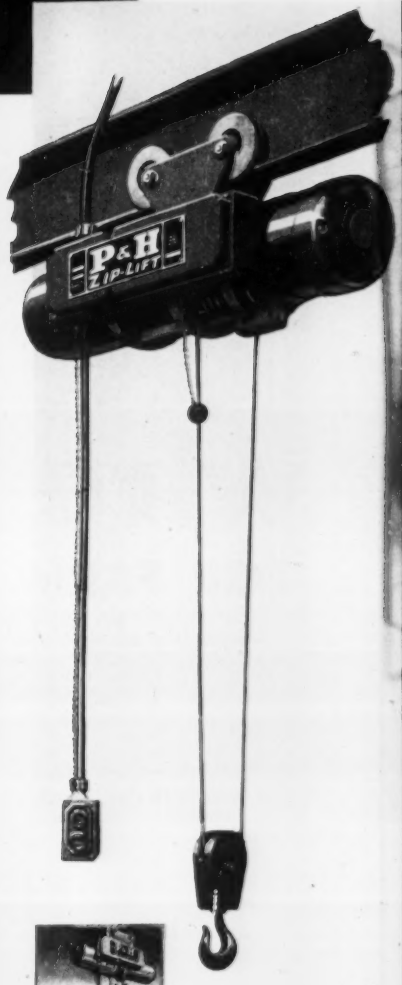
TEN HEADS ARE BETTER THAN ONE

especially when it's *your* spring those heads are concentrating on. Whether it's a matter of material, design, method of manufacture or deliveries, it's to your advantage to know that the best skills in the craft are instantly ready for group consultation and action.

Make these plants your partners in mechanical progress.

SPRINGS
SMALL STAMPINGS
WIRE FORMS

GET SET TO SAVE MAN-HOURS



WITH A ZIP

HANDLE IT "thru-the-air"!

In thousands of plants the Zip-Lift is saving millions of hours — letting workers make the most of their time and skills — with the effortless speed of "thru-the-air" handling. Along production lines, beside machine tools, on shipping platforms — wherever loads are handled frequently — your workers can merely press buttons, and the Zip-Lift does the rest.

And remember — there's no substitute for Zip-Lift quality and reliability.

You pay so little more for ADDED VALUES like these:

SAFER Full magnetic control with current reduced to 110 volts at push button. Plugging crane type limit switch. Large double brakes. For *your* protection, P&H never stretches a motor rating.

LIFETIME CONSTRUCTION Precision-built — shaved gears run in oil — grease-sealed bearings — fully enclosed.

P&H

ELECTRIC HOISTS

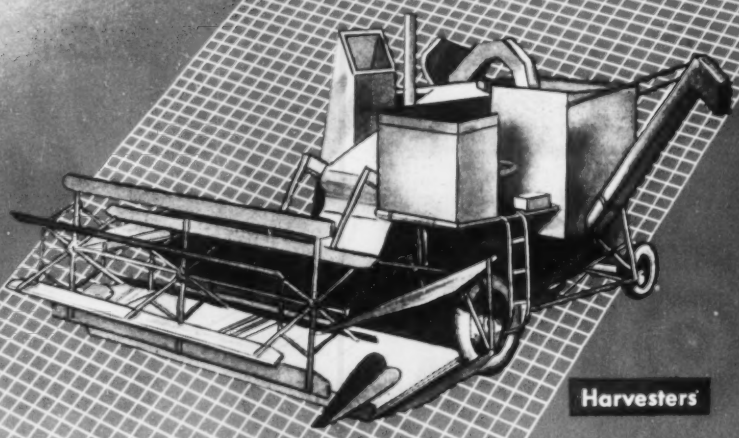
4411 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

SEE YOUR ZIP-LIFT DEALER, or write us for Bulletin H-20-1 —it's filled with time-saving ideas for you.

AVATORS • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • CRAWLER AND TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

from HARVESTERS to FANNING MILLS...



wire cloth
FOR FARM EQUIPMENT

- Harvesters
- Tractors
- Combines
- Corn Pickers
- Cotton Pickers
- Lime Spreaders
- Orchard Sprayers
- Fanning Mills

Even though the types of farm equipment are so different from each other... even though the uses of industrial wire cloth in that farm equipment are so many, and so wide, and so varied ... Reynolds wire cloth has proven its dependability over and over again. And yet farm equipment is only one of several industries that Reynolds wire cloth is serving so satisfactorily. Reynolds has more than fifty years' experience. A consultation on your wire problems costs you nothing.

REYNOLDS WIRE DIVISION
NATIONAL-STANDARD COMPANY

DIXON, ILLINOIS

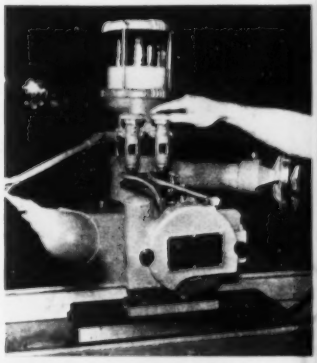
NS NATIONAL-STANDARD Company NILES, MICHIGAN

DoALL "COOL GRINDING"

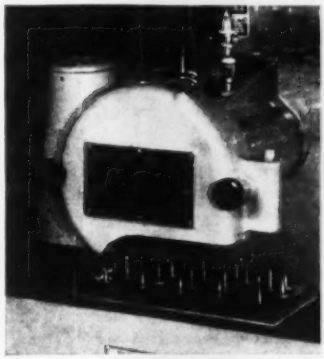
U. S. Patent No. 2470350

COOLS THE CUT AND THE WORK
NO BURNING OR CHECKING
FASTER GRINDING
GREATER ACCURACY
LONGER WHEEL LIFE
FULL VISIBILITY
NO SPLASH GUARDS
NO MESSY TANK OR PUMPS

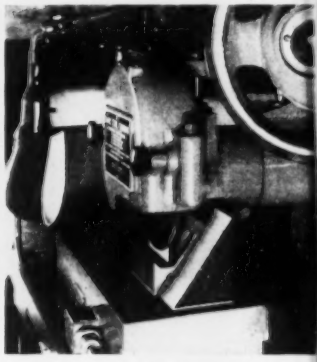
There is a DoALL Precision Grinder for every surface grinding requirement.



The coolant is metered to flow into and through the wheel.

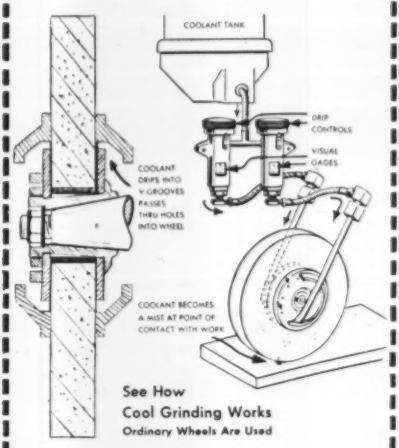


Grinding piercing dies—a tough job done faster, better by "COOL GRINDING."



Full visibility of wheel and work —a big benefit in form grinding.

HOW IT WORKS


COOLANT TANK
DRIP CONTROLS
VISUAL GAGES
COOLANT DRIPS INTO V-GROOVES PASSES THRU HOLES INTO WHEEL
COOLANT BECOMES A MIST AT POINT OF CONTACT WITH WORK

See How
Cool Grinding Works
Ordinary Wheels Are Used

IN DoALL "COOL GRINDING" coolant flows *through* the wheel and atomizes at the point of work. Every cutting particle is surrounded by coolant. *Standard wheels are used.* The results are spectacular. Big time and labor savings, greater precision, longer life between tool grinds are just a few of the benefits. There is a complete line of DoALL Precision Grinders with "COOL GRINDING" for every toolroom and production job. Ask to have a DEMONSTRATION of one of these grinders in your own plant.

THE DoALL COMPANY, 254 N. Laurel Ave., Des Plaines, Ill.

SEND FOR CATALOG

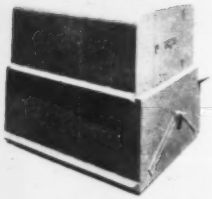
Tells all about the benefits of "COOL GRINDING," shows DoALL Precision Grinders for every requirement.

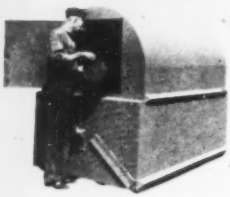
DoALL

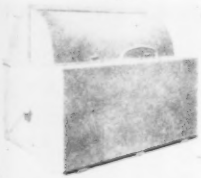
27 SALES-SERVICE STORES

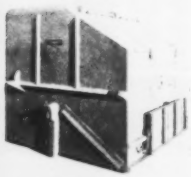
Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplies

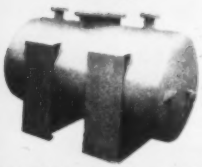
How The Dempster-Dumpster System Cuts Cost of Equipment . . . Eliminates Re-Handling of Materials!









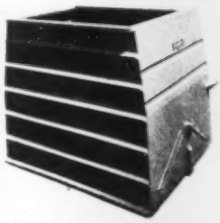


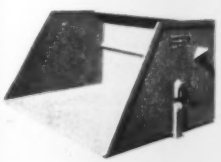
One Truck-Mounted Dempster-Dumpster Picks Up, Hauls and Dumps Scores of Pre-Loaded Containers, One After Another, Regardless of Size or Design for Handling Liquid, Solid, Trash, Dust, Light, Heavy or Bulky Materials.

You can eliminate large investments in trucks, reduce the cost of gas, oil and maintenance . . . avoid time lost by loading crews while trucks make haul . . . and eliminate re-handling of materials by installing the Dempster-Dumpster System!

In the first place, three to five conventional dump trucks with crews cannot possibly do as efficient and economical a job as one truck-mounted Dempster-Dumpster with only one man, the driver. Dempster-Dumpster Containers are spotted at convenient accumulation points inside and outside your plant. The driver and his Dempster-Dumpster are constantly on the move servicing one loaded container after another. The Model LFW Dempster-Dumpster illustrated above handles containers up to 12 cu. yd. capacity. Containers up to 21 cu. yds. are available for use with our Type ARLF and Type DTLF Dempster-Dumpsters. Your Dempster-Dumpster and driver may be handling liquids on one haul, solids on another, waste materials on another, etc. The Dempster-Dumpster driver can pick up a load, put it in carrying position and dump it in 2¼ minutes!

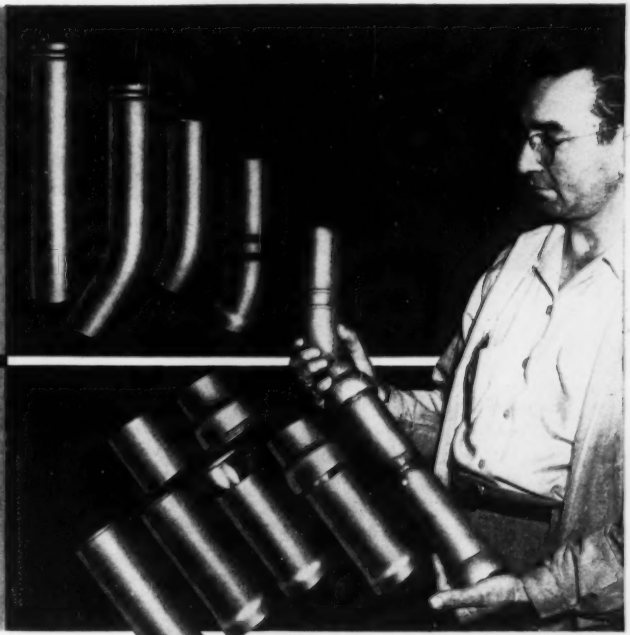
Without question, the Dempster-Dumpster System is the most economical and most efficient method of plant materials handling by truck yet devised! Write today for complete information. Manufactured exclusively by Dempster Brothers, Inc.





DEMPSTER BROTHERS, 691 Dempster Bldg., Knoxville 17, Tenn.

They're saying *Mighty Fine Things* about ELECTRUNITE TUBING at Ryan...



Steps in production of Ryan-patented Ball-and-socket-joint Exhaust Assembly, fabricated from ELECTRUNITE *Stainless Steel Tubing by Ryan Aeronautical Company for the Douglas C-124 "Globemaster II."*

"...lends itself very well to achieving unusual configurations..."

•

"...production is conducted with high degree of efficiency and low factor of waste..."

•

*"...*ELECTRUNITE'S *uniform wall thickness allows sure, safe, controllable bending of the tube without wrinkling..."*

•

"...uniform in diameter, strength, weight, workability and other characteristics..."

Expanded on a punch press, swaged, bent to shape . . . then subjected to hundreds of service hours at cherry-red exhaust temperatures and under severe vibration . . . that's the punishment dealt out to these stainless steel exhaust stacks on the Douglas C-124 "Globemaster II."

High physical and metallurgical accuracy are two of many advantages Ryan gained by specifying Republic ELECTRUNITE Tubing. Ryan metallurgists were assisted in their choice of the right ENDURO stainless steel alloy by Republic's 3-Dimension Metallurgical Service . . . a combination of field, laboratory, and mill metallurgical advice.

You can have the benefits of Republic's 3-Dimension Metallurgical Service for your products . . . a letter or phone call will bring the Republic Field Metallurgist to you.

REPUBLIC STEEL CORPORATION
STEEL & TUBES DIVISION
224 EAST 131st STREET • CLEVELAND 8, OHIO

REPUBLIC STEEL

Republic
ELECTRUNITE
STAINLESS STEEL TUBING AND PIPE

Republic Tips

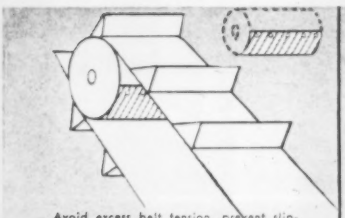
TO ELEVATOR BELT USERS

● With Republic Elevator Belting on the job, you're set to handle bigger pay loads with less trouble.

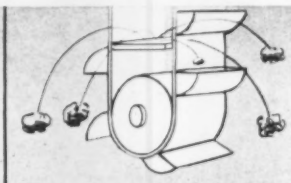
Don't lose this advantage by improper methods of application and maintenance!

Your local Republic Rubber Distributor can show you many ways to improve efficiency and increase service life of elevator belts. As an experienced specialist, he is fully prepared to help you select exactly the right Industrial Rubber Product for your requirement. Contact him today.

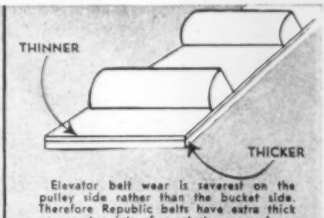
Remember, Republic Rubber has been *the* specialist in the field of Industrial Rubber Products for more than 50 years. Use Republic products and you use the best. Use Republic products *correctly* and you save the most!



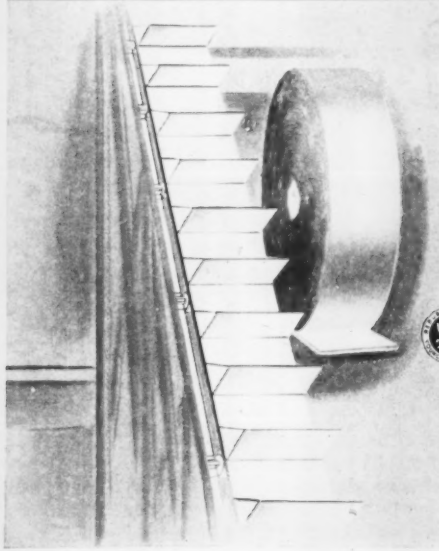
Avoid excess belt tension, prevent slippage and minimize wear on belt pulley cover by lagging the head pulley.



Shield foot pulley with sloping deflector to prevent falling material from jamming or punching holes in belting.



Elevator belt wear is severest on the pulley side rather than the bucket side. Therefore Republic belts have extra thick covers at points of greatest wear and are plainly branded "Bucket Side" for proper installation.



stop costly breakdowns with REPUBLIC ELEVATOR BELTING!

Republic Elevator Belting is built to keep moving under the most grueling working conditions.

Made in fold-edge construction with multiple plies of heavy, prestretched rubber-insulated fabric, Republic Elevator Belting is specially designed to resist bolt pull at the buckets.

Tough abrasion-resistant black rubber covers give belt carcasses maximum protection . . . stand up longer under more severe service requirements.

Republic Elevator Belting is supplied in all standard widths and plies. All fabrics are permanently treated against mildew.

See your local Republic Distributor or write direct for full facts.

INDUSTRIAL RUBBER PRODUCTS BY

REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

"Tycol Anepro carries heaviest loads... lowers bearing failure... slices lubrication costs"

Indeed it does! Tycol Anepro Greases measure up to severest shock-load conditions encountered in the rolling of steel. They protect bearings from moisture, heat, and abrasive impurities. Anepro's exceptionally high film strength and non-corrosive properties result in far longer bearing life . . . faster rates of production . . . minimum down-time for heavy-duty equipment.

Call or write today for complete information from your nearest Tide Water Associated office.

TYCOL
INDUSTRIAL LUBRICANTS

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TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE - NEW YORK 4, N.Y.

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Keep this date with a Free World's Destiny

For the first time in history, the metal scientists of the nations of the free world will meet to exchange ideas and discuss techniques of higher production under critical metal shortages. Because this is the first time a thing so meaningful and so unusual in international relations has been achieved, you'll not want to miss it—you'll find the World Metallurgical Congress technical sessions fascinating proof of the free world's need for better understanding and better fellowship. Be an eyewitness at this history-making event.

NATIONAL METAL EXPOSITION

NATIONAL METAL CONGRESS

WORLD METALLURGICAL CONGRESS

What's in Vermont this month?

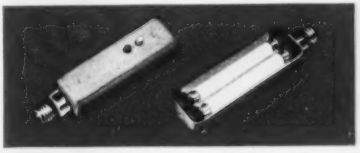
BRYANT EXPANDS ITS INDUSTRIAL INTERESTS

Bryant Chucking Grinder Company has recently purchased an interest in Stocker & Yale, Marblehead, Massachusetts. This affiliate manufactures the "Lite-Mite," a fluorescent work light for use on bench work, machine tools, sewing machines, microscopes, etc.

The "Lite-Mite" is only $6\frac{1}{4}$" long, yet contains two fluorescent tubes, reflector, switch, ballast and related control equipment. It may be installed by screwing into any conventional light socket for 115-volt, 60-cycle A.C. operation. End or side mount can be provided.

The "Lite-Mite" is up to 200° F. cooler than incandescent lamps and gives up to 500 foot-candles at 3" to 5" working distance—5 times the illumination for comparable incandescent cost. Its unusually rugged construction makes the "Lite-Mite" ideal for industrial applications.

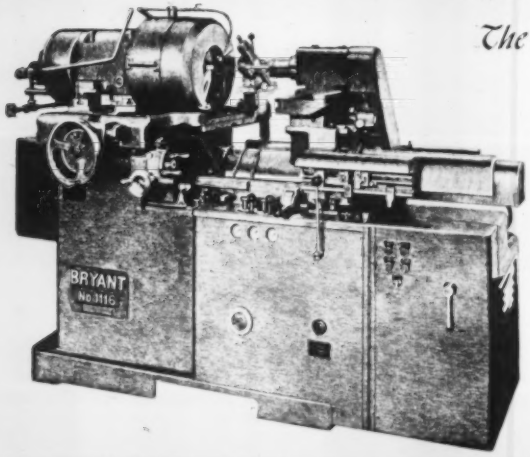
Stocker & Yale also manufactures a wide line of "Lite-Mite" fluorescent illuminated magnifiers, miniature optical projectors and optical instruments. All



products are sold through electrical distributors, specialty dealers and trained representatives. Inquiries should be addressed to Stocker & Yale, Marblehead, Massachusetts.

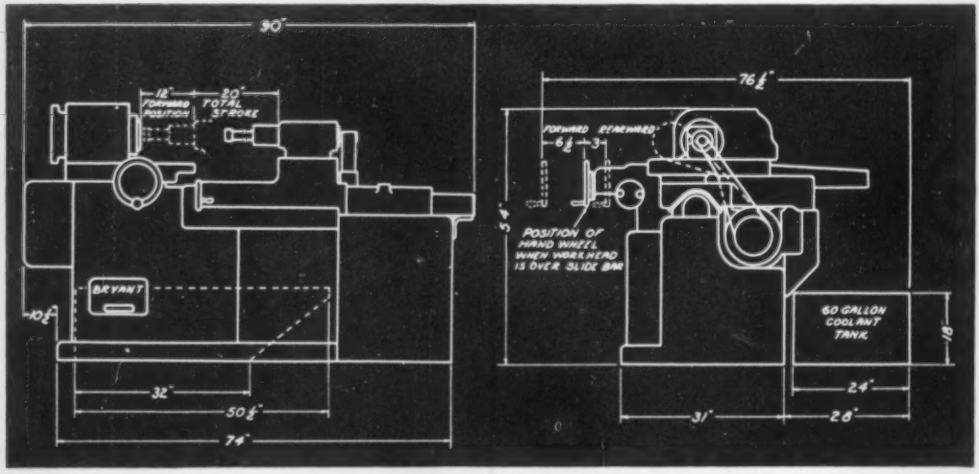
Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

FOR HOLE GRINDING

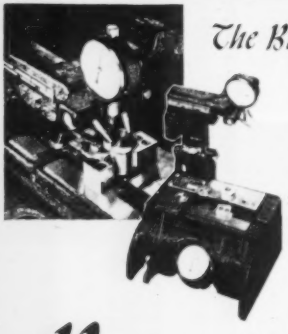


The Bryant 1116 Hydraulic Hole Grinder

This machine is for general purpose hole grinding. It has convenient centralized controls and all features necessary to handle a variety of work with minimum time and effort needed for changing jobs. For stable 3-point support, the wheel spindle is mounted on a cylindrical bar which is supported on 2 cylindrical bearings. The rear of the slide is supported on a hardened and ground guide plate. Workhead may be swiveled for grinding tapers up to 90° included angle. Provision is made for mounting a face grinding spindle in addition to the hole grinding spindle. The No. 1116 will swing 16" with 8" max. hole depth. Write for folder.



FACE SQUARE WITH INTERNAL THREAD



The Bryant Thread Gage with Squareness-of-Face Attachment

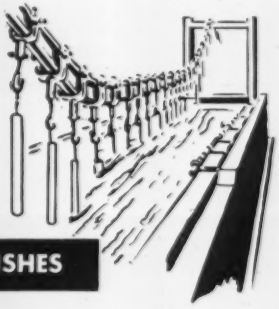
When a face must be checked square with an internal thread, the part should be held on the thread flank and rotated in this position. The Bryant Gage does this, regardless of variation in roundness, P.D., lead or thread form. The squareness-of-face indicator is raised by a yoke at a constant rate regardless of face run-out, thus giving a direct and exact reading of squareness with the thread axis. Simultaneous readings can be made — the Bryant Gage checks thread size — the Attachment shows face run-out.

Bryant Thread Gage gives accumulated reading of P.D., form and lead on dial indicator 4 to 5 times faster than plug gaging!

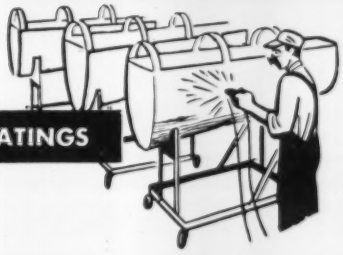
Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

Is Your Finishing Problem one of COATING METALS?

You'll find United Chromium a big help to you in operations requiring...



CHROMATE FINISHES



ORGANIC COATINGS

ELECTRO-DEPOSITED METALS

When you run into a snag on a defense order because of *finishing* problems, you can get under way faster and with less wasted expense through the help of United Chromium's finishing engineers. You benefit by their specialized knowledge of coatings for metals—and the recognized advantages of Unichrome plating processes; protective paints, lacquers and synthetics; chemically produced finishes.

To cite a few: Unichrome Dips and Anozinc* are easy-to-use, economical products employed to meet government specifications for chromate conversion coatings on zinc. Unichrome Lacquers and Enamels for armaments, aircraft, etc. . . . Unichrome SRHS Baths for 20% to 80% faster hard chromium plating . . . Unichrome Copper Plating Process yields a dense deposit ideal for masking in nitriding and carburizing.

*Trade Mark

Write or phone us on your problem in finishes for metals . . .

UNITED CHROMIUM, INCORPORATED

100 East 42nd St., New York 17, N. Y.

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In Canada: United Chromium Limited, Toronto, Ont.

UNICHROME Trade Mark

COATINGS for METALS

for DC Heliwelding

Your best bet is

AIRCO THOR-TUNG ELECTRODES

Here's a tungsten electrode that's especially designed for all positions on straight polarity, DC Heliwelding on stainless steel, copper, mild steel and aluminum, using Heliwelding, Airco's inert gas arc welding process. Made with thoriated tungsten, long-noted for its excellent electron emission characteristics, Airco Thor-Tung offers these advantages —

IT DOESN'T MELT . . .

Airco Thor-Tung does not "ball up" at the end of the electrode nor does it sputter off into the puddle when subjected to high arc welding temperatures — because of its cool operating characteristics, longer life is obtained from each electrode.

NO CONTAMINATION . . .

Airco Thor-Tung permits the operator to "touch-start" directly on the work without contaminating the work or the electrode. Uncontaminated electrodes increase production and result in better welds.

EXCELLENT ARC STABILITY . . .

One of the keys to consistent weld quality and ease of operation is good arc stability. With Airco Thor-Tung, the arc is very stable and does not wander or climb up the electrode even at low currents. Touch starting is made easy even with currents as low as 15 Amperes. The better stability of these electrodes enables a given size to be used over a wider range of currents.

ECONOMICAL . . .

Thor-Tung's permanency, ease of operation and stability make it the most economical electrode for straight polarity, DC Heliwelding.

For full information about Airco Thor-Tung, write your nearby Airco office today.

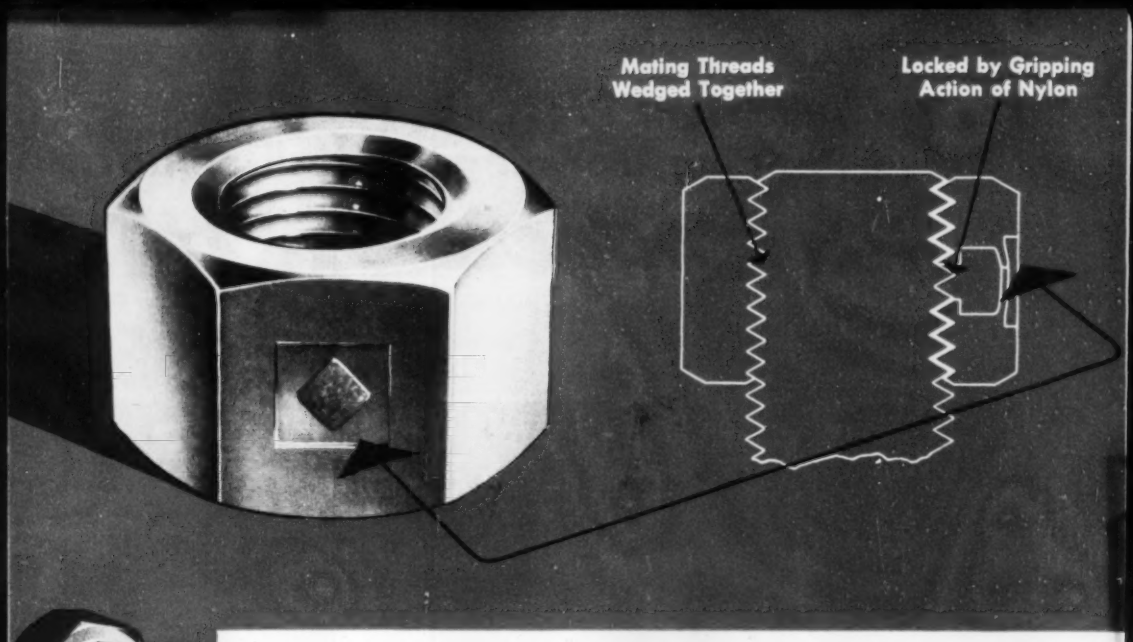
AIRCO

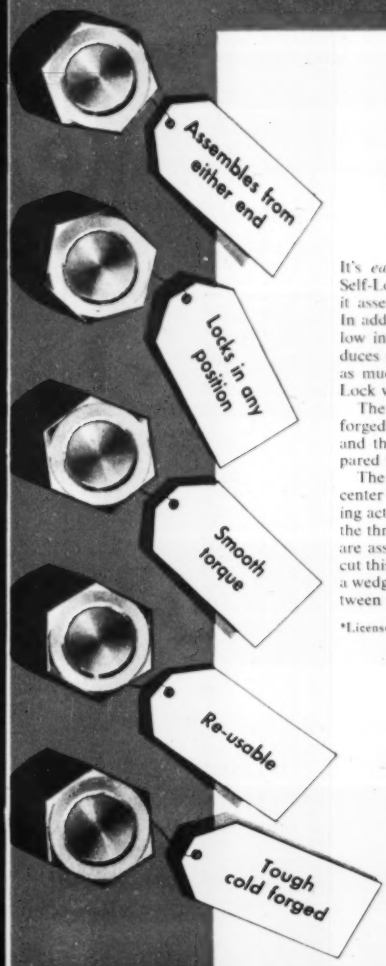
AIR REDUCTION

AIR REDUCTION SALES COMPANY . AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL

Divisions of Air Reduction Company, Incorporated

Offices in Principal Cities





Easy Does It With
Townsend Nylok Locknuts

It's *easy* to install the new Townsend Nylok Self-Locking Nut* as it has no top or bottom—it assembles readily even in blind applications. In addition, you get positive locking action with low installation torque. This saves time and reduces scrap losses due to seizing and galling by as much as 80% over other types of locknuts. Lock washers and jam nuts are eliminated.

The Townsend Nylok Type "E" Nut is cold forged to provide added strength in the body and threads and to save critical material compared to nuts machined from bar stock.

The small nylon plug insert located in the center of one of the hex faces provides the locking action. This plug extends beyond the crest of the threads in the nut and when the nut and bolt are assembled the bolt compresses but does not cut this nylon plug. The nylon plug then reacts as a wedge creating strong metal to metal action between the male and female threads.

*Licensed under The Nylok Corporation patents.

Nylok nuts lock in any position. Seating is unnecessary. Due to nylon's ability to retain its original shape, these nuts can be used again and again. This feature makes it especially desirable in setting adjustment screws. Nylok nuts have high tensile strength, excellent heat resistance and are unaffected by most chemicals.

The Townsend Nylok Locknut is available in American Standard Light (E-6) and Light-Thick (E-7) series—in sizes ¼" through ⅜". It is a suitable companion to Townsend's Tufflok Nut which is a one-piece cold forged nut, with a hexagonal fibre washer as the locking medium. Both locknuts have been highly successful in offsetting vibration and shock. They have back of them Townsend's 135 years of experience in wire drawing and cold heading.

For information on how to save time, eliminate waste and produce better equipment with Townsend Locknuts, write for our locknut bulletin.

Townsend

COMPANY • ESTABLISHED 1816

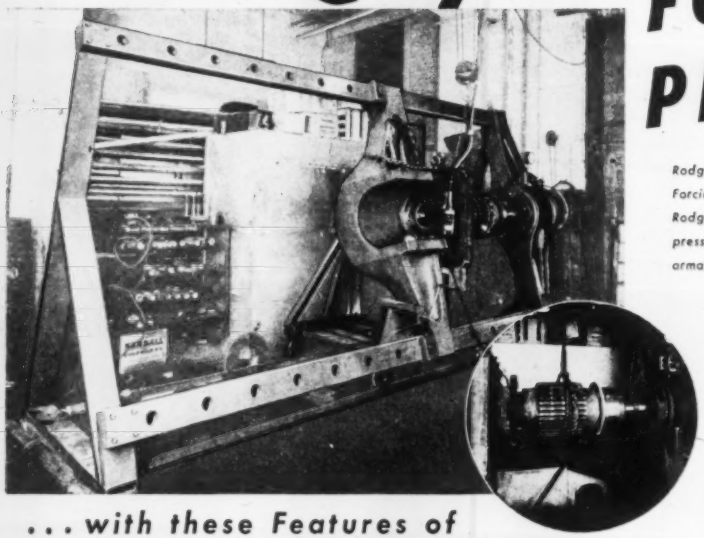
Plants—New Brighton, Pa. • Chicago 38, Ill.

Cherry Rivet Company Division, Los Angeles, California

Sales Offices in Principal Cities

For Fast, Efficient Pressing Bending, Forming, Straightening...

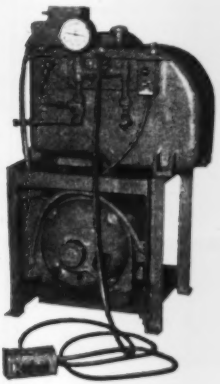
New Rodgers FORCING PRESSES



Rodgers 300 Ton, 75° Inclined, Stationary Forcing Press, one of many in the complete Rodgers line. In the application shown, the press is being used efficiently to press an armature shaft.

. . . with these Features of Construction and Operation

- **SEPARATE PUMPING UNITS**—Choose from individual hand-operated or power-driven pumps to operate any model Rodgers Forcing Press.
- **REMOTE CONTROL OF POWER PUMPS**—Operator can control press from any desired position.
- **REMOVABLE HYDRAULIC CYLINDER**—Cylinder is easily removed from head member to permit servicing or use for other power applications.
- **INDIVIDUAL FRAME UNITS**—Tracks, tension bars, abutment member and head member are all separate units to facilitate handling and erection of press.
- **EXPERTLY ENGINEERED AND CONSTRUCTED**—All units of Rodgers Forcing Presses are made strong, durable and dependable to give years of reliable service.



. . . Separate Power Pump

Select your press operating unit from hand-driven pumps or power-driven pumps. Shown is a Rodgers 2-cylinder Power Pump with remote control.

. . . In these Types and Sizes

Rodgers Versatile Forcing Presses are available in portable or stationary models—horizontal, vertical, 75° or 90° inclined—100 to 600 tons—with hand-operated or power-driven pumps. In this broad selection, you'll find the ideal press to meet your requirements.

Send for New Catalog...

For full details and specifications on the complete line of Rodgers Forcing Presses send for Catalog 315.

HYDRAULICS Rodgers THE WORLD MOVES

Rodgers Hydraulic, Inc.

7423 WALKER ST., ST. LOUIS PARK, MINNEAPOLIS 16, MINN.

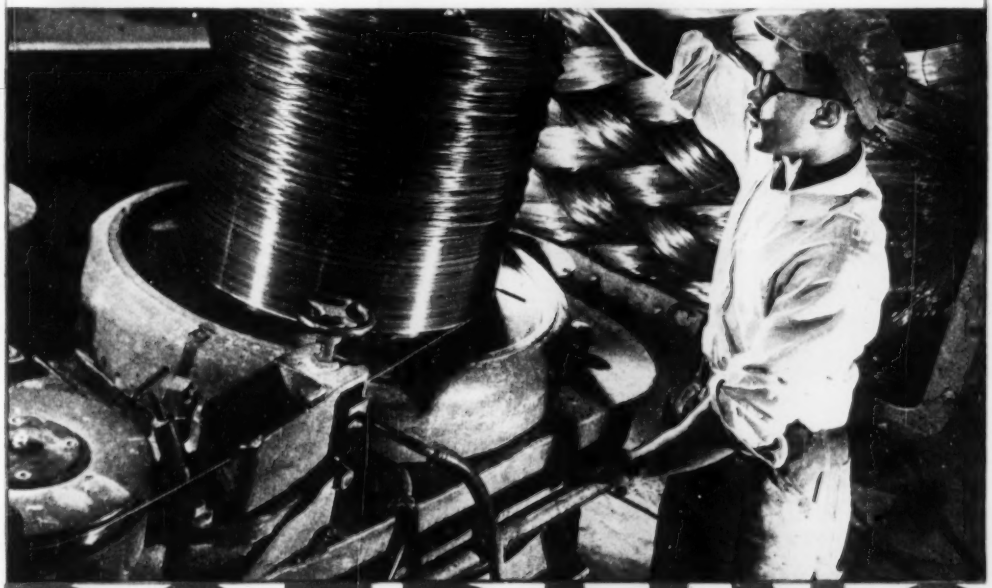
HYDRAULIC POWER EQUIPMENT

TEMPERED WIRE

Roebling Oil-Tempered Spring Wire gives you a better product . . . speeds your production

EVERY INCH of Roebling Oil-Tempered Spring Wire is exactly like every other inch. It's a *quality* wire, mechanically and metallurgically uniform from end to end . . . brings users fewer machine stoppages and rejects . . . saves preparation time in plants from coast to coast.

Roebling's is one of the largest specialty wire mills in America and from steel-making to finished product every manufacturing step is performed in Roebling's plants. Today large quantities of this wire are required in the nation's rearmament program, but Roebling will always do everything possible to meet your requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.



ROEBLING

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STAR·MO M-2

conserves critical materials to everyone's

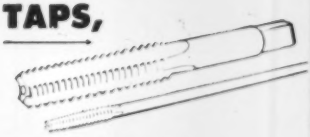
ADVANTAGE!

- ★ 29% Lower Base Price
- ★ 7% More Tools per Pound *(lower spec. grav.)*
- ★ Tougher than standard 18-4-1 Class B High Speed
- ★ Very good abrasion resistance
- ★ Lower Hardening Heats

Lower power consumption
Reduced wear on salt bath equipment

Specify STAR-MO *(M-2)* for . . .

TAPS,

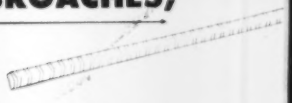


TWIST DRILLS,

REAMERS,

MILLING CUTTERS,

BROACHES,



THREAD CHASERS, LATHE and PLANER TOOLS

Star-Mo (M2) turns the necessary substitution requirements of NPA to *big advantages* for High Speed steel users.

Firth Sterling's Star-Mo (M2) is tougher than the standard 18-4-1 Class B High Speed when it is in the heat treated condition. Star-Mo (M2) also has an abrasion resisting quality approximately equal to the standard Class B 18-4-1 steel.

Write for Bulletin SL-2036

Firth Sterling

STEEL & CARBIDE CORPORATION

3113 Forbes Street, Pittsburgh 30, Pa.

Offices and Warehouses:* HARTFORD, NEW YORK*, PHILADELPHIA*, PITTSBURGH*, CLEVELAND, DAYTON*, DETROIT, CHICAGO, BIRMINGHAM*, LOS ANGELES.

8-243

*Overcured Sections — unavoidable every 30′ to 40′ in all belts made by the flat press method. Only Rotocuring (continuous, non-stop curing) eliminates this major cause of belt failure.

OCS* means Trouble Ahead!

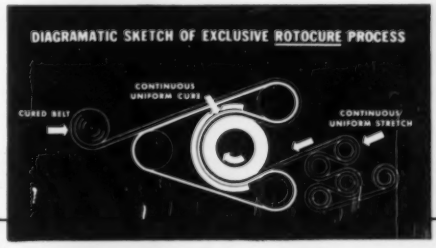
This Achilles Heel of Conventional Conveyor Belts now completely eliminated by ROTOCURE

Your neighborhood tailor with a hot pressing iron can give you a simple but dramatic example of what *too much* heat and pressure applied to a given area of cloth (or rubber compound) can do to these structures. In the manufacture of conveyor belting by conventional flat press curing the result is overcured segments 2″ to 4″ long across the belt width. These weakened portions of the belt are inherent in this process of "start and stop" vulcanization. They get a double treatment because earlier cured areas move forward *less than a full press length.*

Rotocure, the modern BWH method, eliminates these Achilles Heels of otherwise strong belting. Your Rotocure belt is *constantly* in uniform motion during vulcanization.

How does it pay off? In (1) elimination of mechanical distortion at the press ends, (2) up to 40% increased belt flex life, (3) constant, uniform stretch, (4) uniform, abrasion-resistant covers. Remember the major CURE for high belt maintenance costs and premature belt failure is NO OVERCURING! You'll cut the costs of whatever you convey. See your BWH distributor or write us direct.

P.S. Look into BWH rotocured transmission belts also. They permit operation at lower tensions. You get an *additional* bonus in extended belt life.



BWH DEPENDABLE RUGGEDNESS

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

Contact man for an organization serving you

In Los Angeles his name is Joe,—in Cleveland it's Harvey. Like his "brothers" in principal cities throughout the country, he is *your* key to lower steel inventories, more helpful information, *complete assistance* in the use of tool, alloy, or stainless steel. He's the fellow on the telephone order desk at your nearest Carpenter MILL-BRANCH WAREHOUSE.

The first time you call him, you'll discover you're getting something *more* than "just steel service". For he is backed by a MILL-BRANCH WAREHOUSE organization. It embraces "trouble-shooting service" right in your own plant. It is backed by trained delivery crews and modern equipment to process orders, fast.

Most important—it is *part and parcel* of the specialty Mill in Reading. Every time you call your Carpenter MILL-BRANCH WAREHOUSE you benefit from Mill Laboratory and Metallurgical Help, Mill Quality Controls—*comprehensive Mill Service.*

Truly, it's almost like having a *specialty* steel Mill right next to your receiving dock!

Whenever you want specific job recommendations, help with a problem or top-quality steel, get it by calling Carpenter. Try it and see. Simply pick up your phone and talk to the man on the order desk at your nearest Carpenter MILL-BRANCH WAREHOUSE or Distributor. The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.

CALL *Carpenter*

for Mill-Branch Warehouse Service

SPECIALTY TOOL • ALLOY • AND • STAINLESS STEELS

Have you ever seen a flying 'dust' man?

...Then ask a Buell Engineer to determine the most efficient, most economical method of collecting nuisance dust —for you

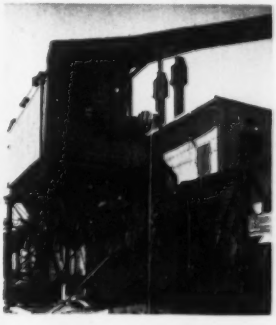
When we're called upon to solve a nuisance dust problem, Buell engineers plan with precision, yet move with surprising speed.

Quickly they can pin-point your major cause of escaping dust...analyze the dust as to particular characteristics...Then, with a sureness that comes only by experience, they will recommend, design and build the Dust Collection System that will most efficiently and economically do the job.

The result? Employee morale goes up. Plant-community relations reach new and more favorable levels.

Buell engineers—a highly skilled group of industrial "dust" men—are backed by more than 200 man-years of experience in the science of dust collection. For full information write today. Ask for the new, informative Buell 'Dust Collection' bulletin. Buell Engineering Co., Dept. 26-I, 70 Pine Street, New York 5, N. Y.

'SF' Electric Precipitator collecting nuisance dust in a foundry.



ELECTRIC CYCLONIC

HIGH-EFFICIENCY CYCLONES • ELECTRIC PRECIPITATORS
TYPE 'LR' COLLECTORS • LOW DRAFT LOSS COLLECTORS
SPECIAL PURPOSE COLLECTORS • DUST HOPPER VALVES

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ENGINEERED EFFICIENCY IN DUST COLLECTION

For any kind of metallurgical construction

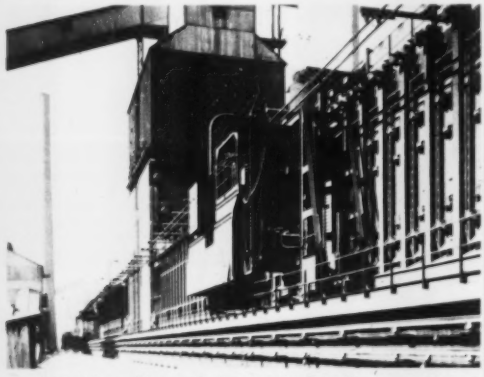
The installations pictured here give some indication of the scope of Koppers Metallurgical Engineering and Construction Services. Our Engineers and Management welcome the opportunity to consult with you.

ALL BRANCHES of the iron and steel industry *can count on Koppers* for comprehensive design, engineering and construction services, because Koppers Company is a specialist in the metallurgical field.

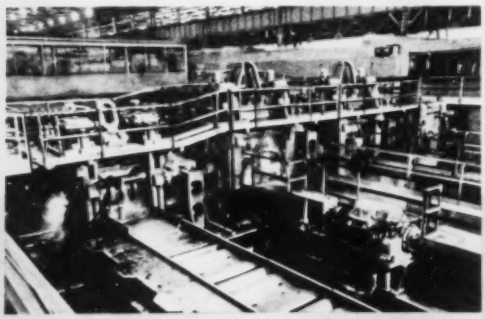
The Engineering and Construction Division of Koppers has long been recognized as a leader in the design and construction of coke-oven plants, auxiliaries and coal chemicals plants.

The Freyn Engineering Department of this Division specializes in the design and construction of blast furnaces, open-hearth furnaces and sintering plants . . . in the engineering of mills, power plants and other steel plant facilities.

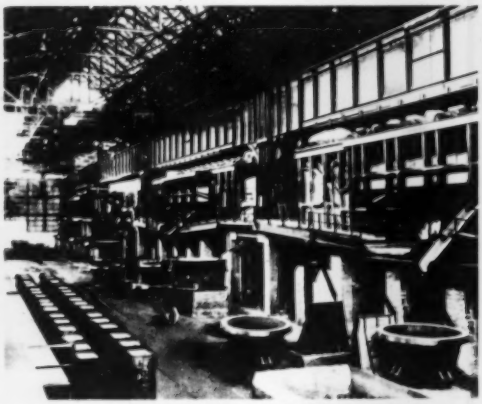
Freyn-Designed and Constructed Sintering Plant. The sintering process permits *maximum* utilization of iron-ore fines and blast-furnace flue dust; also, it increases the pig-iron production of existing furnaces.



These 106 new Koppers-Becker Underjet Coke Ovens carbonize approximately 2,600 net tons of coal per day. Built in two batteries, they are equipped with Waste-Gas Recirculation and Blast-Furnace Gas Underfiring Equipment.



Freyn-Designed Structural Mill and Traveling Tilting Tables.

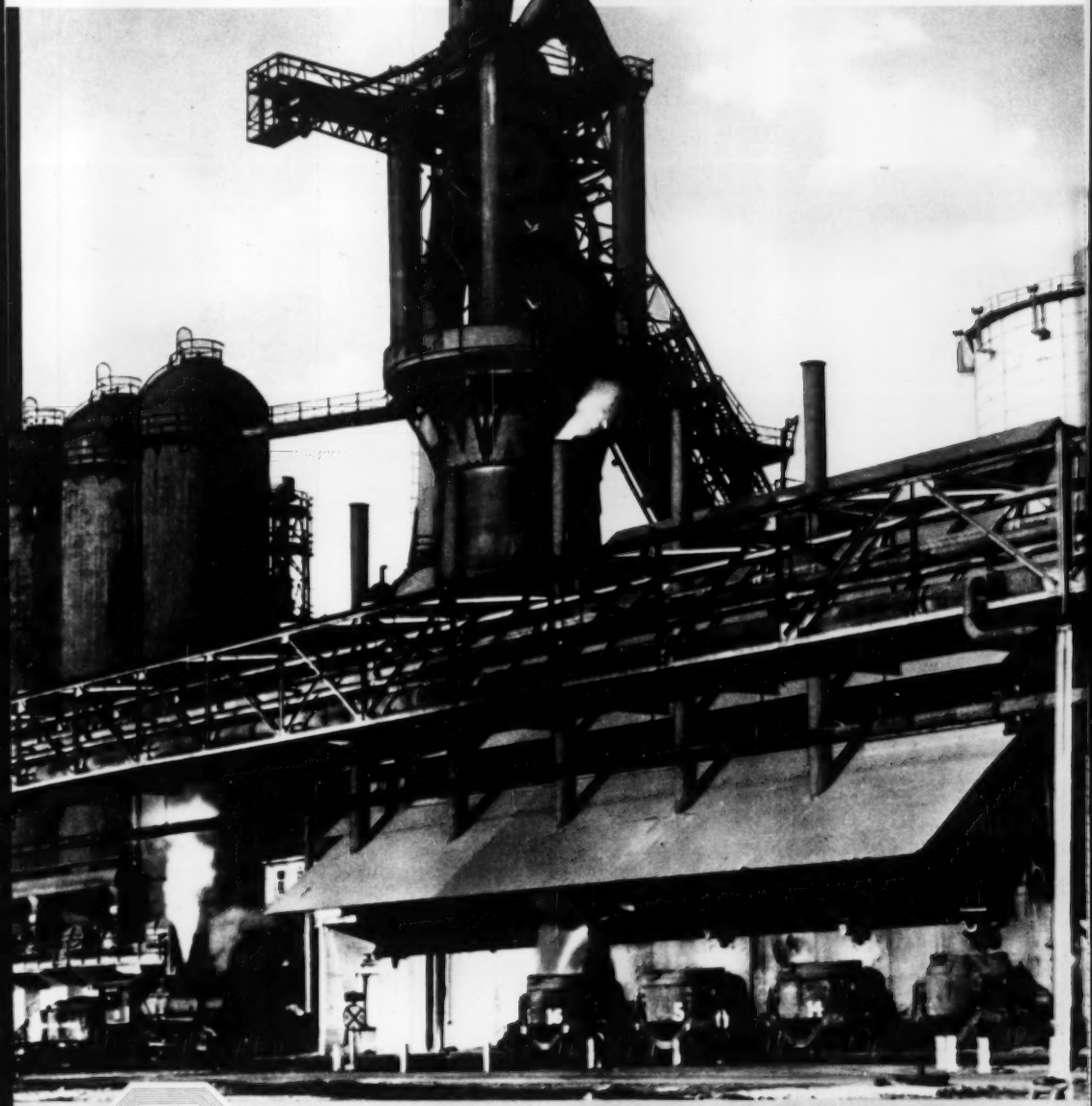


Freyn-Designed and Constructed Open-Hearth Furnaces.

This plant was constructed by Koppers for the recovery of ammonium sulphate, tar, light oil and pure benzol products from the carbonizing of 1,050 tons of coal daily.

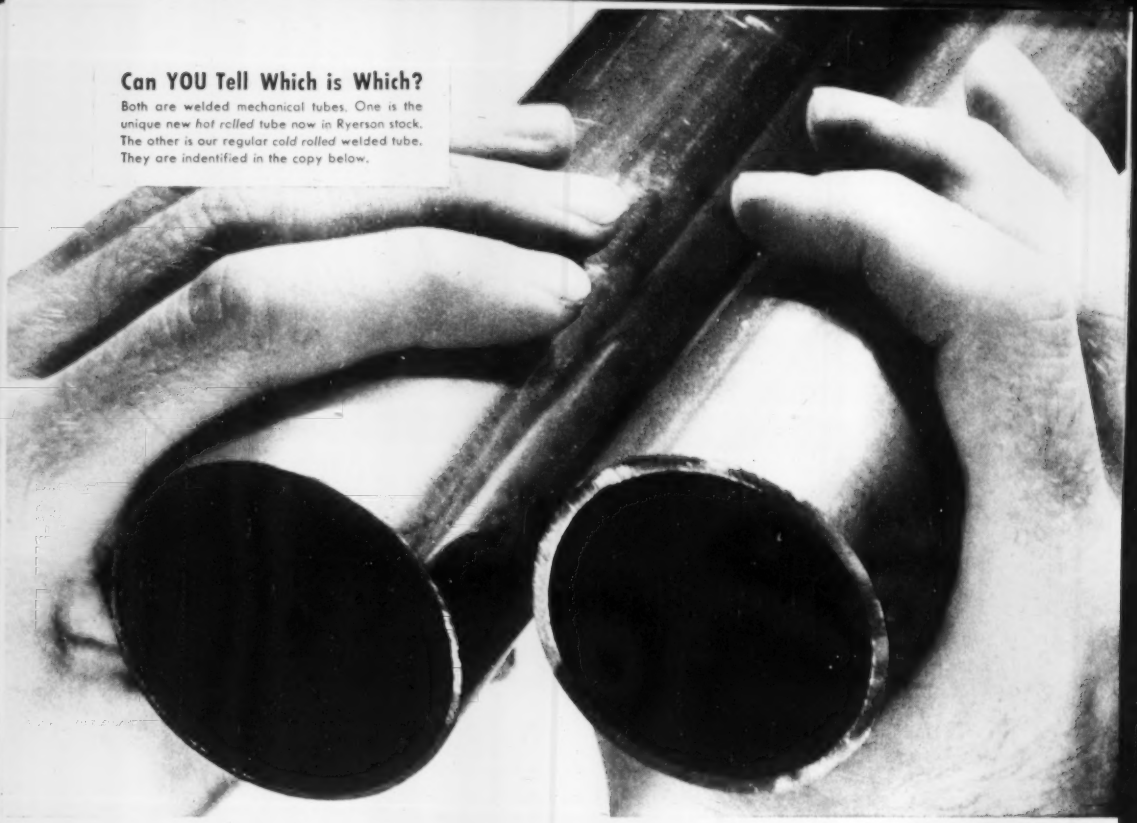
YOU CAN COUNT ON KOPPERS!

Typical Freyn-Designed and Constructed Blast Furnaces and Stoves.



KOPPERS *Engineering and Construction Division*

KOPPERS COMPANY, INC., PITTSBURGH 19, PA.


Can YOU Tell Which is Which?
Both are welded mechanical tubes. One is the unique new *hot rolled* tube now in Ryerson stock. The other is our regular *cold rolled* welded tube. They are indentified in the copy below.

New* Stock of Hot Rolled Welded Mechanical Tubing

We are happy to offer a new Ryerson product—*hot rolled* welded mechanical tubing with a finish which is far superior to that of the usual hot rolled product. In the unretouched photograph above, this new tube is on the right.

The tube on the left is from our regular stock of *cold rolled* welded mechanical tubing. Both hot and cold rolled are in good supply at Ryerson. So you can get immediate shipment of either one in a wide range of round and square sizes.

Of course the cold rolled tube must be used for most plating and all applications which require an *extra* bright, smooth finish. But, in some other applications, our hot rolled welded tubing can be substituted — at considerable saving. Its finish is that good.

For example, the hot rolled needs no surface preparation to take paint better than the cold rolled.

The convenience of fast, accurate cutting service is always available at your nearby Ryerson plant. And Ryerson tubing specialists will gladly work with you on any tubing problem. So call us for welded tubing, now in good supply, as well as for other tubing requirements.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled and cold finished
STRUCTURALS—Channels, angles, beams, etc.
PLATES—Many types including Inland 4-Way Safety Plate
SHEETS—Hot and cold rolled, many types and coatings
TUBING—Seamless and welded, mechanical and boiler tubes
ALLOYS—Hot rolled, cold finished, heat treated
STAINLESS—Allegheny bars, plates, sheets, tubes, etc.
MACHINERY & TOOLS—For metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

The Metalworking Outlook

September 17, 1951

The Hump in Steel Is Ahead

Crucial point in steel will occur in the first quarter of 1952. Steel requirements then will be approximately one million tons greater than in the fourth quarter of 1951. No shutdown for repairs of equipment or relining of furnaces will be permitted except in emergency situations. After the first quarter, what? Additional new capacity will be coming into operation all through 1952, and consumer ordering under CMP should by then have become more orderly. So, barring an all-out war, there should be a better balance between demand and supply, some steel company executives are saying. One of them, W. W. Sebald, president of Armco Steel Corp., Middletown, O., predicted in a talk in Paris that the steel shortage will end by mid-1952, barring war with Russia.

Trouble Shooter: DX

The DX symbol has been made official by NPA. It'll be used for products, components and materials other than steel, copper and aluminum when delay in delivery would jeopardize top urgency defense programs. NPA emphasizes that the symbol does not constitute a new priority band, but is an emergency device strictly limited in use. One of its first applications: Procurement of vital components for machine tools.

A Matter of Priority

Inability of mining machinery manufacturers to procure sufficient steel and copper endangers the nation's production and processing of scarce mineral ores. Mining machinery makers say unless materials for mining machinery can be obtained, they'll be compelled to convert manufacturing capacity to machine tool components or military goods. It is illogical, they aver, to give preference to scarce metals for machine tool builders and producers of military goods while withholding preference from mining machinery manufacturers, whose products produce these very metals that are scarce. NPA agreed to give all the help possible.

Precious Commodity: Labor

Keep an eye on your workers—labor pirating is on the uprise. Manpower problems in the year ahead promise to be the most difficult that hiring officers have faced since the war. Occupational shortages have about tripled in the past year; during August alone there were openings for 3500 machinists and over 8000 engineers and draftsmen.

Cause for Inflation

You'll have to get more output per man-hour from your workers if annual wage boosts based on productivity are to mean anything.

Production-Engineering News—p. 83 *The Market Outlook—p. 151*

Hikes in wage costs per unit of production have outstripped productivity increases throughout the postwar years. Annual increase in output per man-hour since the turn of the century has averaged about 2.6 per cent. Productivity in ten leading manufacturing industries is now about 26 per cent above 1939. Wage costs per unit of production are about double the 1939 level.

Staging a Comeback

The fall production push is on. It's likely that both durable and nondurable industries will stage strong comebacks from summer lows. Federal Reserve Board's index rebounded in August to 218 per cent of the 1935-1939 base period, up five points from July. Prospects are good that it will reach its year's high this fall.

Stratospheric

Jet aircraft fly high and fast—but so do their production costs: It takes about 3½ times as many dollars to build a typical jet fighter airframe today as it did to construct its World War II counterpart. The more than 30,000 separate parts under the sleek hide of a jet airframe not only give the aircraft industry cost headaches but manpower problems as well. Highly trained scientists and engineers are essential in places where draftsmen worked before. Back in 1941-42, it took 414 engineering hours at $1.69 for a typical piston-engined planes. Today eight times as many engineering hours are needed at $4.20 each.

Straws in the Wind

Reynolds Metals Co. developed two processes for making cans without hard-to-get tin, one with heavy aluminum foil and plastic, the other with foil and steel sheets. Representatives of the Armed Forces will get first call on the new methods . . . Frank Folsom, president of Radio Corp. of America, says there eventually will be 50 million owners of TV sets in the U.S. . . . Columbia Broadcasting System's manufacturing subsidiary, CBS-Columbia Inc., is mass-producing color television sets. First units are now enroute to or in dealers' hands . . . The new Pittsburgh Lectromelt furnace in operation at the Houston plant of Sheffield Steel Corp. will boost capacity of the mill to about 1 million tons a year.

What Industry Is Doing

The scrap drive isn't at the pots and pans stage yet, but the shortage of scrap is keeping mills and foundries down to only a few days' supply (p. 55) . . . Thousands of military instead of millions of civilian items mean a plentiful supply of industrial finishes (p. 58) . . . Bone up on an important subject by reading "Civil Defense for Industry and Institutions" (p. 62) . . . Hot-rolled sheet and strip capacity at the beginning of the year was 30 per cent higher than in '48—one indication that the industry is shaping its capacity to today's needs (p. 65) . . . And the defense program has altered the steel distribution pattern (p. 66).

UNITED

ROLLED THREAD STUDS

MILLED STUDS THREADED ROD

Milled studs are carried in stock from ¼" x 1" to as large as 1¼" x 12". Special milled studs are made to the most exacting specifications and in any desired quantities.

We have extensive facilities to roll thread any special studs you require, from 2-56 thread and larger. Continuous threaded rod can be furnished in any thread diameter up to and including ⅝", and in lengths measured in inches or in feet.

You will find "UNITED" a good source for your requirements.

—when you think of fasteners think of United

SCREWS · NUTS · WASHERS
CLUTCH HEAD SCREWS
STAMPINGS

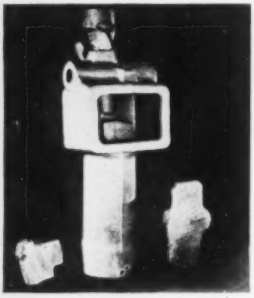
United Screw and Bolt Corporation

Chicago 8 Cleveland 2 NewYork 7

The Chris Erhart Foundry & Machine Co., Cincinnati 3, Ohio, produced this Jordan plug, requiring strength and toughness, in ductile iron for Black-Clawson Co., a leading manufacturer of pulp and paper mill equipment.

• • •

This high strength clamp can take a 90° twist without cracking or fracture . . . because it is ductile iron . . . cast for The Langslow Corporation, Rochester 9, N. Y., by The Acme Shear Company, Bridgeport 1, Conn.



Bison Castings, Inc., Buffalo, N. Y., cast this hydraulic jack cylinder in ductile iron for strength and pressure-tightness. Note, at right and left, sections cut from castings to show soundness.

DUCTILE IRON

approaches properties of cast steel; is readily produced by GRAY IRON FOUNDRY PRACTICE

DUCTILE IRON is a cast ferrous product that combines the *process advantages* of cast iron with many of the *product advantages* of cast steel.

In less than two years, ductile iron has attained wide acceptance, because it offers excellent castability, high mechanical properties, and good machinability. Parts cast in ductile iron show superior strength and pressure-tightness, high modulus and resistance to shock.

Typical current applications include bombsight parts, clutch drums, dies for automotive fenders and bumpers, electrical fittings, pistons for diesels, side frames for forging hammers, sprockets & gears, and many other parts.

AVAILABILITY

Send us details of your prospective uses, so that we may suggest a source of supply from some 100 authorized foundries now producing ductile iron under patent licenses. Request a list of available publications on ductile iron . . . mail the coupon now.

The International Nickel Company, Inc.
Dept. S., 67 Wall Street, New York 5, N. Y.
Please send me a list of publications on: **DUCTILE IRON**

Name..... Title.....

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INCO

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

The "Line"

One who reads publications issued by A.F. of L. and C.I.O. is impressed by the similarity between aims expressed by William Green and Philip Murray and policies advocated by President Truman. These three individuals stick tenaciously to a definite set of objectives. To all intents and purposes it is the "line" which all faithful members of union or party must adopt if they wish to remain in the good graces of their leaders.

In his Labor Day message, President Green stated that the unions' request for representation on key defense agencies was complied with by the government but turned down by Congress. "The same coalition of Dixiecrats and reactionary Republicans that was responsible for the reprehensible Taft-Hartley Act teamed up against us again. It rejected our appeal for strengthening price control and opened the door for higher prices and still higher profits at the behest of Big Business interests." President Murray declared "the Taft-Hartley Act, that evil law which symbolizes an outworn philosophy of 'master and slave' must be repealed." He also railed at Congress, profiteering, etc.

It is significant that these union leaders stressed virtually the same points —hatred of the Taft-Hartley Act; animosity toward reactionaries, Big Business and all persons who are anti-Fair Deal; and resentment against Congress for its failure to kowtow to unions on every issue. These are points which Mr. Truman emphasizes at every opportunity.

Fortunately there is abundant evidence that this hallowed "line" runs counter to the beliefs of many members of the Green and Murray unions and of Mr. Truman's party. Many of them feel that the triumvirate's hysterical wailing about Taft-Hartley is ridiculous in the light of President Truman's effective use of it to avert serious trouble on nine occasions. Also casual reading of independent labor journals—ones not controlled by unions—shows that a substantial portion of union members does not swallow the "line."

It is too bad that there is so much demagoguery at the top of unionism currently. If the leaders were more truly representative of their members, employers and unions would get along much better.

E. C. Shaner

EDITOR-IN-CHIEF

SCRAP NEED IS ACUTE: Most immediate pressing problem of the metalworking industries is to produce enough scrap to keep the furnaces of steelmakers and foundries in operation. The present flow of scrap is barely keeping pace with minimum requirements. The spokesmen of government and industry who are warning of possible shutdowns because of lack

of scrap are not crying wolf needlessly. The situation really is precarious.

To be successful the drives now under way must produce results quickly. It is imperative that a substantial backlog of usable scrap be gathered during the remaining months of good weather in order that an adequate reserve will be on hand to supply the furnaces during severe winter periods. This scrap problem involves everybody who uses rolled steel and ferrous castings. Energetic co-operation in these scrap drives is a "must" for every metalworking and metal-using company. —p. 55

* * *

WE USE MORE MOTORS: Manufacturers of electric motors are enjoying an upward trend in almost every one of their widely diversified markets. Sales this year may total $1.4 billion. They range from the most powerful motors used in industry to the fractionals employed in ever increasing number in homes, on farms and in commercial establishments.

It is estimated that industry alone is using about 10 million motors. The number per plant is increasing steadily because of the trend toward more conveyors, air conditioning, unit heating, etc. The use of small motors is increasing in homes, on farms and in commercial establishments. For a test, guess offhand quickly how many motors you think are in your home. The chances are good that you will underguess. Par for an average suburban home is 20 to 30 fractional horsepower motors. —p. 57

* * *

IMPACT OF DEFENSE: American Iron & Steel Institute's compilation of distribution of finished steel products for the first half of 1951 reflects the initial impact of the defense program. Strangely enough it is not as noticeable in the increase of tonnage distributed to the military as it is in the distortion of distribution to conventional consumers.

For instance, shipments to "ordnance and other military," which in 1950 were only 0.27 per cent of all mill shipments, in the first half of 1951 were 1.16 per cent of the total. As against this moderate increase, steel for the automotive industry was cut from 20.04 per cent of the total in 1950 to 17.47 per cent in the first half of 1951. Rail transportation, an important support for defense, received a substantially larger portion of steel. Warehouses, distributors to "small business," increased their "take" slightly.

Perhaps we will have to wait for the figures for 1952 to see the real impactof defense upon steel distribution. —p. 66

* * *

AFFECTS CUTTING OILS: As mobilization for defense gains momentum, its influence is reflected in an ever widening circle of activities. This influence spreads from production, fabricating, finishing and assembling operations out to many industries which contribute supplies or services to these operations.

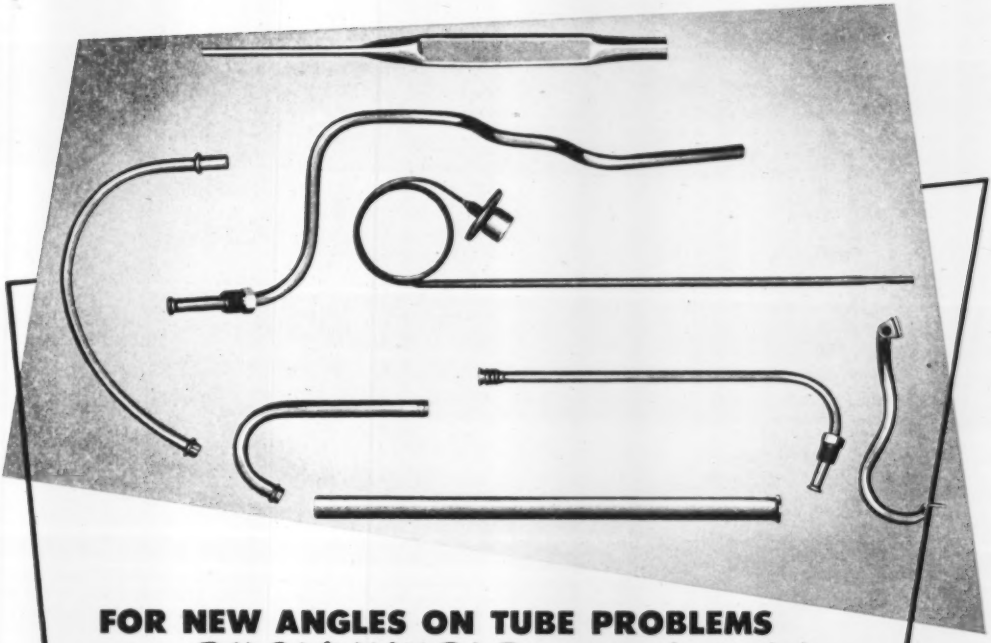
A case in point is the impact of defense work upon the 35 to 40 companies which sell cutting oils and coolants. Defense activity is responsible for lifting this industry's shipments from 70 million gallons in 1950 to 75 million gallons in 1951. In addition to this increase in volume, defense work is changing the proportions of oils and coolants consumed. For instance, the marked increase in production of jet engines tends to increase use of grinding oils and to reduce that of cutting oils. Changing requirements are forcing the development of new compounds, as for example, chlorinated waxes and pastes. —p. 56

* * *

IN MINUTES NOT HOURS: Demand for oil and gas casing, drill pipe and line pipe has more than tripled in less than a decade. This was one factor which led to development of continuous seamless pipe mills and more recently to continuous heat processing of pipe by equipment integrated into the production line.

A typical heat-treating cycle under the conventional batch method consists of heating to 1575° F in 5 hours, holding at temperature 4 hours, water quenching to 400° F, when equalized placing in warm furnace, heating to tempering temperature in 3 hours, holding for 4 hours, air or water cooling, straightening, stress relieving for 3 hours. These operations require a minimum of 19 hours.

For continuous treatment a typical cycle involves heating to 1575° F in 3 to 5 minutes, water quenching to 120° F, heating to tempering temperature in 1 to 3 minutes, air or water cooling. No stress relieving or straightening is necessary. Total time is about 10 minutes, physical properties of the pipe are superior and no alloying additions to the steel are necessary. —p. 97



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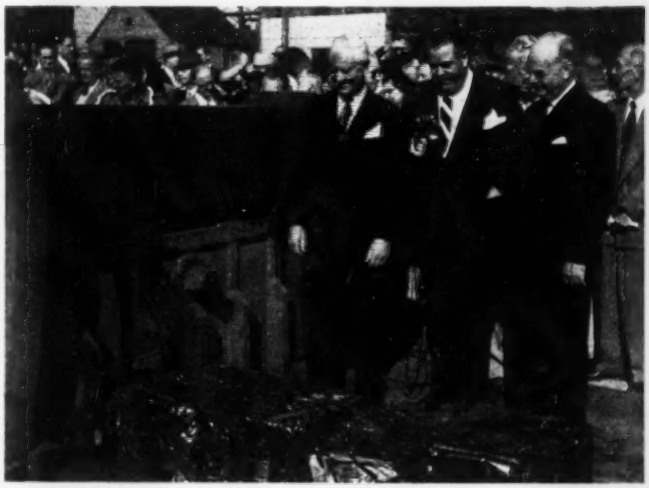


THE CHRISTENING: To attract attention to the scrap drive, ceremonies in which prominent personages participated were held to formally put into operation a new king-size scrap baling press at the A. Shaw Co., Cleveland scrap dealer and broker. Among those taking part are U. S. Secretary of Commerce Charles Sawyer; H. S. Peck, vice president, Logemann Bros. Co., Milwaukee, which built the press; and Secretary of the Treasury John W. Snyder

Join In Scrap Drive by Cleaning Out

Emphasis is on scrap for steel mills and foundries. If you turn in obsolete machinery, jigs, dies, fixtures now, it may return to you in the form of more steel later

IT'S going to take more than CMP tickets to get steel. It's going to take all of the scrap you get out of your plant!

Scrap supplies are dangerously low and the outlook is bleak for the winter. On top of this, Defense Mobilizer Charles E. Wilson says he wants —and is going to get—more finished steel quarter by quarter next year. That means more scrap will be needed.

Thin Thread—Right now when the weather is the most favorable for collection, preparation and movement of scrap some mills have only enough scrap to keep in production for a few days. In some cases, emergency allocations of scrap are all that are keeping mills running.

So, if you expect steel to be available to you during the next few months and coming winter it's important that you immediately flush out of your metalworking plant those obsolete machines, dies, jigs, fixtures, old pipe and other items that are needed on the national scrap pile.

Kick-Off—An emergency conference of scrap industry leaders, trade association executives and business magazine editors was held last week in Washington to launch a national scrap campaign to ferret out scrap from these sources: Government agencies, industry, farms and auto-wrecking yards. Emphasis is on scrap for the steel mills and foundries, but the drive automatically will yield some nonferrous scrap too. Special campaign for aluminum and copper may start later.

Vertical programs for collecting iron and steel scrap will be launched in each industry, including mining, railroads, public utilities, auto plants, and the oil industry. These vertical programs will be handled through trade associations. In addition, 2000 local scrap mobilization committees are being set up by the National Production Authority and the U. S. Chamber of Commerce. These committees will work on getting out heavy scrap now and be ready in event a "pots and pans" campaign is needed later.

Godfathers — Thirty-three leading steel companies and the American Steel Warehouse Association have assumed responsibility for the drive. Each company has assigned a senior sales executive as campaign manager for the company in the area assigned to it. Then the country has been divided into 335 areas, each with a supervisor in the person of an important sales official. In these 335 areas, approximately 9000 steel and warehouse salesmen will go into each of the industrial subdivisions of the cities or areas where local scrap mobilization committees have been formed. These salesmen will help assure a nationwide combing of every available source of scrap.

Gray iron, steel and malleable foundries need 15 million of the 36 million tons of purchased scrap required this year, and the foundry industry is organizing its own campaign. A top executive of each foundry is being asked to spend full time on the job. More than a ton of scrap is needed to make one ton of steel castings. Hence the foundries' problem is even more critical than that of steel producers, for the latter use only a half a ton of scrap for each ton of steel produced.

Chrysler Gets in the Scrap

The first ten weeks of a drive by Chrysler Corp., Detroit, to ferret out dormant scrap iron and steel yielded 5,236,000 pounds of metal. The drive began in mid-June, and covers not only Chrysler's own plants but also those of its vendors.

In its drive, Chrysler re-examines all tools and dies which have been stored for service work and eliminates those for early model parts no longer needed in production. About half of the metal comes from Chrysler plants and the rest from plants of vendors who hold tools and dies for the company. The campaign is in addition to Chrysler's regular scrapping procedures.

Metal collected in Chrysler's drive is mostly heavy melting scrap, which is the type most desirable for steel mill operations.

Loan Assures Steel Supply

Two metalworking companies are staking a steel producer with a $10 million loan, and in return will be assured of a steel supply.

Putting up the money are Chrysler Corp. and Packard Motor Car Co., both of Detroit. Recipient of the loan: Pittsburgh Steel Co., Pittsburgh. Chrysler is putting up $8 million, Packard $2 million. The steel com-

pany can use the money if it's needed to complete a cold-rolled sheet mill at its Allenport, Pa., plant.

The loan arrangement will assure Chrysler 800,000 tons of steel, and Packard 200,000 tons over the period of 1951-1955. The steel will primarily be cold-rolled sheets.

SUCCESS: Scrap piled up quickly when Lyon Metal Products Inc., Aurora, Ill., asked its employees there to scrape up all the scrap they could find. In the first few days of the campaign 80,000 pounds were rounded up, more was expected. The success inspired the company to plan a drive among employees of its York, Pa., plant also

70 Million Gallons a Year

Cutting oil is flowing in that quantity. Defense requirements will loose a bigger tide

CUTTING OIL and coolants are flowing over, around and on metalworking components at a 70-million-gallons-a-year rate. The defense program may well push volume up to 75 million gallons this year, 20 per cent over 1950. Fortunately in this era of shortage, there is no shortage of cutting oils. And there isn't likely to be.

Quantity and Quality—The 35 to 40 companies (including the major oil companies and four big specialists) that make the important fluid are supplying about half of it for defense metal cutting requirements and will supply even more for that purpose as the program gets rolling. World War II increased demand substantially over peacetime needs because military items required larger chunks of metal, like forgings, a good part of which was whittled away before it was finished. Defense requirements are also causing modifications in the formulations of oils and the proportion in which the different kinds (cutting, grinding, extrusion lubricants, etc.) are used. Jet engines, for instance, need grinding oil, thus reducing the need for cutting oil. Heat resistant steel in jets need oil with more compound in it. Titanium parts call for different types of oil.

TV, Too—Technological developments in oils and coolants are keeping up with advances in tools and processes. New oils have been developed for radio parts that are machined instead of pressed. TV antennas take special lubricants for drawing aluminum rod. Grinding machinery makers are working to perfect better combination grinding-cooling oils for use with improved machines—an important development.

CUTTING OIL
. . . in pace with metalworking's needs

Much research is going forward on standard oils so they can be used, after treatment and modification, as lubricants for cold extrusions, in metalworking under particular pressures, or with extreme reductions or severe draws.

Chlorinated waxes or pastes are one brand-new development and one of the materials considered for heavy applications. One new oil will allow three and four reductions on hard chrome stainless without reading or annealing.

The Trend Today—Biggest development over recent years was the water soluble oils, the so-called pressure soluble fluids. For many metalworking jobs they are replacing usual or ordinary compound cutting oils. Some reaming, tapping, threading and rifling or boring jobs are not done with extreme pressure soluble oils, though. Initial cost is higher, but addition of water—even up to 100 parts to 1—make per gallon cost lower for many uses. Ratio of water to oil varies with work to be done.

Price on soluble oil still runs 30 to 40 cents a gallon in tank cars. Supply is the big factor in holding that price level. Cost of oils, some manufacturers say, have not increased; freight rates and packaging costs caused the 5 to 15 per cent rise since a year ago.

New Steel Production Record Established

MORE STEEL was made last month than ever before in August.

This record-breaking amount, a preliminary calculation by the American Iron & Steel Institute shows, was 8,722,000 net tons of steel for ingots and castings.

To make that tonnage, steelmaking furnaces operated at an average of 98.5 per cent of capacity, compared with 98.2 per cent in July.

With the August output, the 1951 production rose to nearly 69.7 million tons, compared with 63.5 million tons in the comparable period of last year.

The August production was slightly higher than the July outturn of 8,679,247 tons. Additional details are:

	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of week in months
1951	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
February	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.00
March	8,059,625	104.2	408,926	85.6	602,504	93.9	9,071,055	102.4	2,047,642	4.43
1st Quar.	22,840,119	101.7	1,166,763	84.2	1,673,041	89.8	25,679,923	99.9	1,996,884	12.86
April	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29
May	8,071,270	104.3	408,650	85.6	614,579	95.7	9,094,499	102.7	2,052,934	4.43
June	7,667,811	102.3	403,001	87.1	586,148	94.3	8,656,960	100.9	2,017,939	4.29
2nd Quar.	23,596,242	103.9	1,204,123	85.9	1,791,615	95.0	26,591,980	102.2	2,043,965	13.01
1st 6 mo.	46,436,361	102.8	2,370,886	85.0	3,464,656	92.4	52,271,903	101.1	2,020,561	25.87
*July	7,704,433	99.8	411,599	86.4	563,215	87.9	8,679,247	98.2	1,963,631	4.42
†August	7,689,000	99.4	437,000	91.5	596,000	92.9	8,722,000	98.5	1,969,000	4.43
1950										
August	7,318,908	98.0	405,118	84.8	518,148	86.1	8,242,174	96.5	1,860,535	4.43

Note—The percentages of capacity operated in 1951 are calculated on weekly capacities of 1,746,337 net tons open-hearth, 107,806 net tons bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951, as follows: Open-hearth 91,054,020 net tons; bessemer 5,621,000 net tons; electric 7,554,630 net tons; total 104,229,650 net tons.
* Revised. † Preliminary figures, subject to revision.

Electric Motors: Muscles for Industry

Demand is heavy for industrial-type motors, backlogs are growing and defense orders increasing. If motor makers can get materials requirements, they'll have great years ahead

IT'S hard to visualize a plant without electric motors because they supply much of the muscle for getting jobs done. Industry's current expansion is putting a big load on motor builders and raising dollar value of order backlogs to new highs. Direct military business is sizable and will be an even bigger factor next year than this

SHORTAGES—of silicon sheets, hot-rolled carbon steel, iron, aluminum and copper, particularly copper—may short-circuit production plans of big-motor manufacturers for attaining high production goals they have set for this year and next. The protective fuses, credit curbs and materials end-use limitations, are keeping the production current low for builders of small motors.

Makers of big motors (over 15 horsepower) are expecting one of their biggest dollar-volume years this year. Several, like Louis Allis Co. Inc., one of about 20 big-motor makers, expect an even bigger volume next year. Their expectations are well founded—discounting only the materials bugaboo—because defense and defense supporting business is just getting started. It takes the big motors.

Good Customer—The machine tool industry, an important defense supporting business, is among the best customers for industrial-size motors; next year when it is going full tilt it will spend many millions with the industry. And the trend toward more and still more automatic machine tools will keep it a big customer even after a full peace is restored.

Other lavish spenders on motors are the steel and aluminum companies: Their expansion projects, needing large drive motors, will take a huge chunk of horsepower. Examples: Westinghouse Electric Corp., General Electric Co., Reliance Electric & Engineering Co. are already booked for big direct current drive motors for the Fairless Works of U. S. Steel; Louis Allis has the contract for alternating current motors.

Mute Contrast—Companies making fractionals do not have the demand the big-motor makers do. The dropoff in appliance buying slowed up their assemblies, and military orders haven't yet taken up the slack. The aircraft program will fit nicely into the fractional horsepower scheme: In the last war Westinghouse alone supplied 41 fractionals for each B-29.

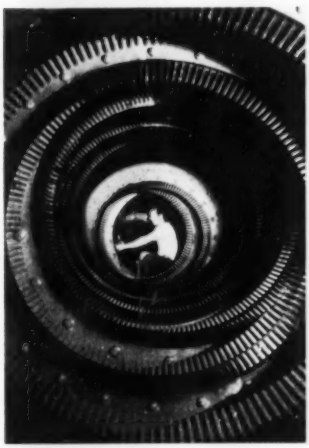
A Michigan manufacturer of subfractional horsepower units (under 1/10 hp), supplying appliance makers, reports an overabundance of labor, except tool makers, and a shortage of business. Another company in the same area, always restricting its output to industrial application (it makes units up to 200 horsepower), is deluged with orders, short of help and necessary materials.

Universal Complaint—The one complaint common to all motor makers be they subfractional, fractional or large integrals, is materials. Some throw the blame on CMP; others decry the copper strike; still others blame no one and are trying to make the most of a rough situation. One manufacturer with defense orders was able to cash its CMP tickets for only 10 per cent of its needs on one product. It was galled severely when it located some silicon sheet and couldn't get authorization to procure it.

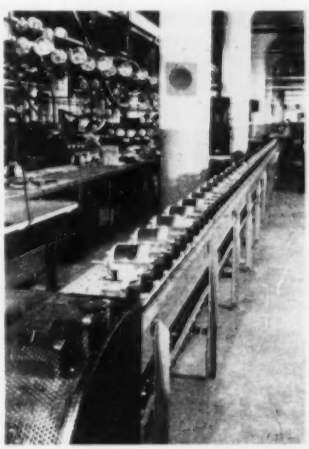
Copper, tightest material, was complicated by the recent strike. But listen to one motor builder: "Steel, copper and aluminum are essential to motor manufacture; you can reduce the proportion of one only by increasing the proportion of another." Later the meanest shortage could be in silicon sheets. Although they aren't exactly in free supply, they're easier than copper. A further expansion in aircraft building before additional aluminum productive capacity is ready could easily make aluminum "Motor Material Shortage No. 1."

Unlikely Changes—To get around the copper shortage, some manufacturers have experimented with substituting aluminum wire for copper. If aluminum wire is used, silicon sheet requirements are raised and another critical category develops. Although the search for new and better ways of doing things continues, wholesale redesigns to beat the shortages are unlikely. One motor builder in Ohio explains it this way, "Our company and industrial motor builders in general are doing between 90 and 95 per cent DO rated work and if we can't get materials neither will anybody else. Besides, in World War II, we expended many dollars and more important, many engineering manhours, trying to develop designs. Before any of this effort could be turned into motors the war ended."

Bearing Down—Changes in design are evolving gradually directed at producing motors that are more powerful for a given space, are lighter, use less material and have a longer satisfactory service life. Some noteworthy features are aluminum end brackets, rolled and welded steel frames, bearings lubricated for the



HUGE STATOR FRAMES AT G.E.
. . . expansions need big motors



FRACTIONALS ON CONVEYOR LINE
. . . production current is low

life of the motor and improved insulation with a great deal of interest in plastics. Lifetime lubricated bearings are not usually used on motors for domestic appliances because they cost more than sleeve bearings, have less area for dissipating heat and are noisier, thus being objectionable for certain home uses. Now bearings are getting tighter because of the stepup in aircraft manufacture.

How Long?—Waiting periods from the time an order is placed until delivery averages from seven to eight months for most industrial motors. Diehl Mfg., a division of Singer Mfg. Co., makes a range of motors from ¼ to 25 horsepower and says it can effect deliveries on integral units in 18 weeks, in 16 weeks for fractionals.

There are enough motor orders on the books to keep many plants busy for more than a year. Backlogs are growing. Some orders are for major expansion programs; delivery is not required for periods in excess of a year. Such waiting periods must be taken with a little salt. A few companies, hearing of the long waits, come up with designs to eliminate motors, but a little checking into specific requirements might show that they can get the motor they want when they want it. A special big motor (a synchronous job or a direct current unit rated at over 1000 horsepower) would require a longer lead time than the average because of engineering requirements.

Most confusion today is a result of the materials scramble. There is less of it and fewer duplications of orders now than there were preceding World War II. Customers are sticking with their established suppliers rather than scurrying around to a variety of builders.

Breakdown—The motor industry is a complex affair: No manufacturer makes all types; a great many make only a relatively small percentage of all motors sold. About 90 principal companies are regarded as bona fide motor makers; several score make other products besides motors. Many manufacturers who started business during the war dropped out of competition because of the high cost of maintaining service organizations and large replacement parts depots. About 20 of the 90 make the larger industrial types; more than 40 compete for the industrial-type fractional business, in the ⅛ to 1 horsepower range. Only half a dozen get into synchronous and extremely large direct current motors.

A fair amount of overlapping in sizes exists in the industry. Crocker-Wheeler Division of Elliott Co., for example, makes them in sizes ranging from ¾ to 500 horsepower. No two companies manufacture the same range of sizes.

Electrifying—One indicator of the drive of the industry is this: In the last ten years the share of electrical equipment jumped from 2 to 4 per cent of all industrial equipment being produced. Full credit cannot be taken by the motors industry, but its stake was large.

Shipments in the industry totaled $855.6 million in 1947 and will spiral, partly because of inflation, to about $1.4 billion this year. Last price rise—averaging 10 per cent—came last December.

The industry has always employed a large percentage of women. Winding on fractional units is generally done by women. More than one fractional builder has a work force constituted more than half by women. Because many jobs can be broken down into simple elements, it is possible to train new workers for most operations in a month. After two months they have as much skill as they ever will have. Though training is easy, recruiting is not. Says one fractional builder, "It's gotten so bad, we follow every stranger in town." This year the industry is employing about 125,000 people.

Cores of Industry—Industry's appetite for motors is large. There are already an estimated 10 million motors supplying the muscle for a variety of industrial operations. The number of motors installed per plant is mushrooming with processing lines, conveyorization, air conditioning, unit heating and machine tools—all big factors. In the homes electric motors too are on the increase. Homes in many suburban developments are almost totally dependent on electric motors and use between 20 and 30 fractionals per home. Farms have been good motor customers for years and here too new uses are numerous. So, the long range picture looks good for motor builders. All they have to do is surmount their current difficulties—a job that will require a lot of patience, determination and inventiveness.

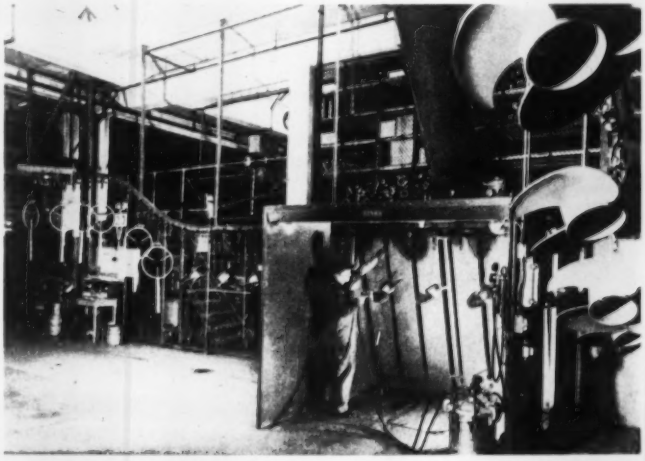
Delivery of Industrial Finishes Brightened by Defense

THE DEFENSE program has painted a rosy picture for deliveries of industrial finishes, but under this superficial brightness is an olive drab business outlook for producers of these finishes.

On a moment's notice you can get deliveries of all conventional industrial finishes such as paint, varnish and lacquer. So fast are deliveries that one industrial finish sales manager quipped: "Order it today and get delivery yesterday."

But such quips are as far as levity goes with the industrial finish makers. They look with gravity upon their future under the defense program. They are afraid conversion to a garrison state will prevent them from realizing any further growth in sales for the duration. In fact, they even fear a set-back.

A Darker Tone—An adequate finish is every bit as important to military items as it is to civilian products, but for a given dollar volume of military equipment less is spent for the finish than is spent for the



PURCHASE OF INDUSTRIAL FINISHES HAS DECLINED WITH DEFENSE
. . . instead of millions of civilian units, only thousands for military

finish of civilian goods of an equivalent worth.

One important consumer—the automotive industry—is a case in point. Instead of using possibly five coats of various protective and decorative finish each one of which may cover an area of 100 square feet on several million units, the industry's war contracts call for output and finishing of only thousands of units for the military.

While an automaker's total sales under these conditions may be equal to or greater than its normal civilian business, its purchase of industrial finishes in no way corresponds. A similar situation exists in nearly every consumer durable item whose production is giving way to dissimilar war materiel. Varnish, paint, enamel and lacquer makers say that less than 1 per cent of the cost of nearly all civilian-type products is accounted for by the finish, but that finish on military items takes a very much smaller fraction.

Drop-in-the-Bucket—The most limited kind of compensation for this situation is found from the slight increase in per-unit consumption which has followed restrictions on the use of plating on certain consumer durables. Finish makers grant that thinner coatings of nickel chrome and copper, for example, have necessitated the use of clear synthetic enamel to protect the plating, and that a few parts which formerly were plated are now painted. But these new applications are but a drop in the bucket compared with the heavy ladling from their business which occurs every time civilian goods production gets another cutback order.

The result is that deliveries for conventional industrial finishes can be made quickly. Where finishes have to be made to the specifications of the buyer there is a slightly longer wait for deliveries.

With industrial sales volume off and raw materials costs in the overall up, makers are caught in the squeeze and have adjusted prices to levels only slightly higher than a year ago.

Lone Star Contract to Selas

A high-speed heat processing line for normalizing welded steel pipe continuously under automatic control will be built by Selas Corp. of America, Philadelphia, for Lone Star Steel Co., Lone Star, Tex.

Designed to accommodate a wide range of pipe sizes, the line will be integrated with other pipe making equipment to form an uninterrupted production line.

FOR SAFETY'S SAKE: Skilled labor for machine tool production is hard to come by these days so Warner & Swasey Co. is taking precautions against infectious diseases sidelining workers in its Cleveland plants. Safeguard shown here is a mobile chest x-ray unit rolling past 3000 workers on production lines to carry on the fight against tuberculosis with little disruption of machine tool output

Men Wanted

Machine tool industry needs 50 per cent more employees, government report says

NEEDED: 50 per cent more employees in the machine tool industry to meet peak production goals under the current mobilization program.

This is the main conclusion of a report, "Manpower Requirements in the Machine Tool Industry in the Current Mobilization Program," released by the U. S. Bureau of Labor Statistics.

The additional employees needed include 400 tool and die makers, 500 mechanical engineers and 5000 skilled machine tool operators. Because of shortages in some of these occupations, recruitment difficulties are expected.

Growing—Production worker employment in the machine tool industry has already increased from 38,700 in June, 1950, before the outbreak of Korean hostilities, to almost 60,000 in June, 1951.

Employers have also added manpower by lengthening the work week by more than five hours since before Korea. Weekly hours in the machine tool industry averaged about 47.6 in May, 1951, higher than in any other manufacturing industry. A further increase in average hours per week is expected if the industry follows the policies that were in effect during World War II when the average work week reached a high point of 55 hours.

Predicated on Peak — The manpower requirements shown in this government report are based upon an estimated production level of $1875 million a year (figured at prices prevailing in the spring of 1951), which is believed to be the peak production rate the industry will achieve in the current mobilization program. This peak, expected by the third quarter of 1952, would be more than double current levels.

Employment gains in machine tool plants will be relatively less than the anticipated rise in production, mainly because the industry is expected to subcontract out more of the work, and to schedule a longer work week.

Loewy Gets Philippine Order

Loewy Rolling Mill Division, Hydropress Inc., New York, received a $2 million contract for a steel mill from the National Shipyards and Steel Corp., Engineer Island, Manila, Philippine Islands. The corporation is an agency of the Philippine government.

The award covers the supply of a complete merchant and structural mill installation, including all mechanical and electrical equipment and furnaces.

The mill comprises an 18-inch and a 12-inch mill to accommodate a wide range rolling program of structurals, bars and merchant products, as well as all necessary auxiliary machines.

Atomic Power-Unit Ordered

Westinghouse Electric Corp. has the Navy contract to build the driving mechanisms of the atomic-powered

submarine under construction at Groton, Conn. The contract covers all propulsion machinery. Westinghouse is expected to build the atomic furnace too, but this has not yet been announced. Electric Boat Co. at Groton is building the $40 million hull of the submarine (STEEL, Aug. 27, p. 48).

Ticket Holders May Get Help

Look for the National Production Authority to take some kind of action around Oct. 1 to provide steel to CMP ticket holders who have not been able yet to "cash" the tickets for fourth-quarter tonnage.

Pressure from consumers, claimant agencies and congressmen for honoring of tickets is terrific at NPA offices. NPA indicated it will see how the situation crystallizes in the next two weeks and then take remedial action.

Aids Given to Small Business

The military services are trying to make it easier for smaller businessmen to keep step in the defense program. The shops with limited machine tool, forging, or casting facilities, for example, can now call on Navy facilities to get the work done under certain conditions.

One condition is that the Naval facilities have open capacity for such work. Then, the firm must be working on urgent Army, Navy, or Air Force contracts and be unable to get delivery on schedule from private sources. If in doubt about qualifying under the new program, it's best to contact the contracting officer of the service which issued the defense contract.

The Air Force, too, has changed its procurement program to let small business in on negotiated as well as advertised jobs. Complete information on all proposed Air Force unclassified procurements over $10,000 will now be available in all regional and district offices of the Air Materiel Command. The surest way to keep informed of procurement invitations is to visit the bid board room of the nearest of these offices.

These Contractors Need Parts

To help the small businessman deal himself a hand in defense contracts, a prime contractors' exhibit will be held Oct. 30 through Nov. 2 in the Agricultural Building, Michigan State Fair Grounds, Detroit. Only parts and equipment for which subcontractors are needed will be displayed. Most of the exhibits will represent the hard metals industry.

For Easier Renegotiation

Incentive military procurement policies under which the producer and the government share in reduction of costs through productive efficiency are recommended in an Industry Advisory Committee on Military Contractor Relationship report to the Munitions Board.

The report calls for a uniform policy with respect to allowable costs, streamlining of the procurement administration, and passage of contract settlement legislation along the lines of the Contract Settlement Act of 1944.

Integration of military demand and administration of procurement policies so as to maintain economic stabilization came in for much attention. The report concludes in part "the administration of such integration assumes critical significance" in times of mobilization. A detailed administrative program for correlation of procurement and renegotiation policies is included.

Frederick C. Crawford, president of Thompson Products Inc., Cleveland, was committee chairman.

Air Program Indicates More Defense Contracts

KEEP YOUR EYE on the air power program as a possible source of prime and sub contracts. Indications are that this program will yield more and more production contract opportunities.

In line with this trend was the multi-million-dollar contract to make flaps for the B-47 Stratojet given to General Fireproofing Co., Youngstown, O., by Lockheed Aircraft Corp., Burbank, Calif. General Fireproofing expects about 1000 will be employed on the project when in full production.

Flying Atom—Another indicator is the development contract granted to Consolidated Vultee Aircraft Corp., San Diego, Calif., by the Air Force for the airframe of an atomic-powered airplane. General Electric Co., Schenectady, N. Y., is also under contract to the Air Force to develop the nuclear power engine.

Other recent contracts in this field include a $3.5 million contract given to Pacific Airmotive Corp., Burbank, Calif., for overhaul of four-engine cargo transport planes, and a $3.5 million contract obtained by Rohr Aircraft Corp., Chula Vista, Calif., for power packages and aft nacelles for the Chase C123. The C123 will be built and final assembly will be made in the Kaiser Willow Run plant.

Watch TV—Worthy of note are the Army's mobile television experiments. Planned as an aid in classroom training for field exercises or as a monitor system for expert observers and maneuver umpires, the mobile TV station will be tested first at Ft. Monmouth, N. J. Described by electronics engineers as one of the most complete television stations ever mounted on wheels, the system is also intended to stimulate tactical uses of television.

If these experiments prove successful, the electronics and allied industries can look forward to more defense work.

Contracts awarded by the government, in excess of $250,000, follow:

Product	Contractor
Water Heaters, Gas Driven	California Steel Products Co., Richmond, Calif.
Ditching Machines	Parsons Co., Newton, Iowa
Bomb Tails	Bell Aircraft Co., Niagara Falls, N. Y.
Generators	Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.
	Jack & Heintz Precision Industries Inc., Cleveland
Transmitters (2 contracts)	U. S. Gauge Div., American Machine & Metals Inc., Sellersville, Pa.
Transmitters, Receivers, Transformers	General Electric Co., Schenectady, N. Y.
Towing Vehicles	H. A. Lowther Co. Inc., Shelbyville, Ind.
Turbosuperchargers	Hotpoint Inc., Chicago
Constant Speed Drives	Sundstrand Machine Tool Co., Rockford, Ill.
Vertical Gyro Indicators	Waltham Watch Co., Waltham, Mass.
Gasoline Pumps	Gary Steel Products Co., Norfolk, Va.
Inverters	Leland Electric Co., Dayton, O.
Mark 28 Fuzes	Lion Mfg. Corp., Chicago
Mine Anchors	Flour City Ornamental Iron Co., Minneapolis
Cartridge Cases	Norris Thermador Corp., Los Angeles
Trainer Tank Guns	American Locomotive Co., Schenectady, N. Y.
Diesel Propulsion Engines	Packard Motor Car Co., Detroit
Machine Guns and Spare Parts	Saco-Lowell Shops, Boston
Spare Parts	Bucyrus-Erie Co., Milwaukee
Machinery & Equipment	Buick Motor Div., General Motors Corp., Flint, Mich.
Machinery & Equipment	Saginaw Steering Gear Div., General Motors Corp., Saginaw, Mich.
	Consolidated Vultee Aircraft Corp., San Diego, Calif.
	Republic Aviation Corp., Farmingdale, L. I., N. Y.
	Westinghouse Electric Corp., Pittsburgh Boeing Airplane Co., Seattle
Engine Spare Parts	Wright Aeronautical Corp., Woodridge, N. J.
Aircraft Spare Parts	Douglas Aircraft Co. Inc., Santa Monica, Calif.
Components, Automatic Pilot	Westinghouse Electric Corp., Pittsburgh
F-94 Parts, Tools, Equipment	Lockheed Aircraft Corp., Burbank, Calif.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

IRON AND STEEL—Amendment of Direction 3 to NPA Order M-1 excludes authorized controlled materials orders bearing the "D" allotment symbol from the preference which such orders previously received for iron and steel. The "D" symbol is applied to authorized controlled materials orders placed by the Army's Civil Works Corps of Engineers, the Army's Panama Canal Co., and the Army's Domiciliary Building, Old Soldiers Home. Steel producers are now permitted to accept or reject authorized controlled materials orders bearing the "D" allotment symbol on the same basis as other authorized controlled materials orders for civilian production. Amendment of Direction 3 was issued Sept. 5, 1951.

ALUMINUM—Amendment of Direction 1 to NPA Order M-5 excludes authorized controlled materials orders bearing the "D" allotment symbol from the preference which such orders previously received for aluminum. (For additional details see above paragraph on Iron and Steel.) Amendment of Direction 1 was issued Sept. 5, 1951.

COPPER—Amendment of Direction 2 to NPA Order M-11 excludes authorized controlled materials orders bearing the "D" allotment symbol from the preference which such orders previously received for copper and copper-base alloys. (For additional details see above paragraph on Iron and Steel). Amendment of Direction 2 was issued Sept. 5, 1951.

FOREIGN PETROLEUM — Amendment of NPA Order M-46A reduces the number of allotment symbols and DO ratings used for foreign petroleum operations. The amendment was issued Sept. 5, 1951.

ALUMINUM—NPA Order M-84 issued and made effective Sept. 7, 1951, permits consumers of aluminum for "destructive" purposes to obtain this metal under a self-certification. "Destructive" users may begin with the fourth quarter to obtain their supplies of aluminum on a self-certification basis by using CMP allotment symbols specified in M-84.

GRAPHITE—Amendment of Sept. 11, 1951, of NPA Order M-66 eliminates inventory limitations on artificial graphite and carbon electrodes.

ALUMINUM SCRAP—Amendment of Sept. 11, 1951, of NPA Order M-22 restricts use of aluminum scrap to persons qualifying as producers, smelters, fabricators or reclaimers. This contrasts with the former regulation which limited consumption of aluminum scrap to producers, smelters and fabricators specifically named in the order. The amendment was effective Sept. 11, 1951.

AUTOMOBILES—Amendment of Sept. 11, 1951, of NPA Order M-68 limits the number of new automobiles which may be equipped with automatic transmissions. The amendment is effective Oct. 1, 1951.

NPA Delegation

RESCHEDULING DELIVERIES — Amendment of Sept. 11, 1951, of Supplement 1 to NPA Delegation 1 authorizes the Defense Department to reschedule deliveries of materials required to carry out its ships and tank-automotive programs. Previously the department had this authority only for its aircraft program. The amendment was effective Sept. 11.

Price Regulations

CASTINGS—Amendment 1 of Ceiling Price Regulation 60 extends the effective date of the regulation on castings prices from Sept. 1 to Oct. 1, 1951. Amendment 1 was issued Sept. 5, 1951.

IMPORTS—Amendment 8 of Ceiling Price Regulation 31 places metallurgical and ceramic grade fluorspar and mercury under this price regulation on imports. Previously they were controlled by the General Ceiling Price Regulation. Amendment 8, issued Sept. 6, 1951, became effective Sept. 11.

BRASS MILL PRODUCTS—Amendment 1 of Ceiling Price Regulation 67 places resellers of brass mill products under this resellers' ceiling price regulation. Previously their pricing was governed by the General Ceiling Price Regulation. Producers of brass mill products are covered by CPR 68. Amendment 1 of CPR 67 was issued Sept. 5, 1951, and became effective Sept. 10.

TRANSFERRED MATERIALS — Amendment 24 of Ceiling Price Regulation 22 and Amendment 12 of Ceiling Price Regulation 30 change sections of the regulations telling manufacturers how to figure the change in net cost of a manufacturing material that is produced in one plant of a company and transferred to another plant of the same company. The amendments, issued Sept. 6, 1951, were effective Sept. 11.

SINTERED TUNGSTEN CARBIDE—Ceiling Price Regulation 71, effective Sept. 10, 1951, is specially designed to provide dollars-and-cents type of ceiling prices on sales of sintered tungsten carbide products and mixed powders. The regulation applies to all sales by manufacturers of these products, except sales for export which are covered by the export regulation, CPR 61. The products covered, including cutting tool tips of sintered tungsten carbide and stellite, are removed from the machinery regulation, CPR 30.

FREIGHT RATES—General Interpretation 3 issued Sept. 10, 1951, by the Office of Price Stabilization clarifies what sellers can do about adding to their ceiling prices the increases in railroad freight rates recently authorized by the Interstate Commerce Commission.

BANNER YEAR FOR METALLURGISTS: Getting an O.K. from top officers of the American Society for Metals is the official banner of the World Metallurgical Congress. It will be displayed at the international gathering on metal resources of the world to be held in Detroit Oct. 14-19. ASM heads beaming approval are (left to right): President-elect Dr. John Chipman, head of the department of Metallurgy at Massachusetts Institute of Technology; William H. Eisenman, executive secretary; and President Walter E. Jominy, chief metals consultant of Chrysler Corp. The Congress meets concurrently with the 33rd National Metal Exposition. Some 45,000 metal engineers and industrial executives will attend the Congress—500 of them from 21 free nations of the world

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

"Must" reading for conscientious management is the booklet "Civil Defense in Industry and Institutions." It tells about preparations against enemy attacks

THE MAIN THING for manufacturers to understand in connnection with civil defense is that if there's an emergency—an enemy bomb attack, for instance—they must be prepared to meet it entirely with their own resources. Under normal conditions an industrial fire, explosion or other disaster brings quick assistance from fire engines, police, hospital ambulances. Under the kind of hostile attacks that civil defense officials must plan against, community movement might be paralyzed. Possibly, police, firemen and hospitals would have more pressing calls. Access to bombed industrial plants might even be cut off by bomb craters in highways.

What To Do—So plants should be organized to be self-sufficient in coping with disaster if and when it comes. Employees should be assigned to specific responsibilities before an emergency. And they should be properly trained to handle such responsibilities like performing police duties, fighting fires, performing first aid and rendering whatever engineering and techical services may be necessary to keep the plant in production or to get it back into production in the least possible time.

How To Do—How does a management go about preparing to meet possible emergencies? A 60-page booklet, "Civil Defense in Industry and Institutions" prepared by the Civil Defense Administration, gets at the answers. Copies may be had from the Superintendent of Documents, Washington 25, at 25 cents. It is "must" reading.

An enormous job lies immediately ahead, says CDA; at least 10 million industrial workers must have civil defense training. As rapidly as it is able to proceed, says CDA, it will bring out booklets dealing with civil defense problems of individual industries. In the meantime the book just issued is a good start.

Capital Chuckles

WIT AND HUMOR in the national capital:

At the Pentagon, where classified documents abound on the order of raisins in a fruit cake, a new designation has been coinsd: "DBR," the abbreviction for "Destroy before reading."

"Illegit'mus Non Carborundum," reads a sign on the desk of a high official in the Commerce Building. A free translation, claims this official, is: "Don't let the s.o.b.'s grind you down."

A secretary in the ECA sports a placard above her desk with these words: "Why be difficult when with a little extra effort you can be impossible."

More Low-Alloy Steel . . .

Boron-treated, low-alloy steels rapidly are becoming available in larger quantities. NPA spokesmen say some 25,000 tons of such steels were scheduled for production in August and the quantity to be made in September should be at least 37,000 tons. Indications are that the October production will be even larger. On this basis, many more consumers will be able to obtain samples of such steels for purposes of determining their suitability for use as substitutes for higher-alloy steels.

On Exporting Information . . .

Effective Sept. 6, the Office of International Trade removed the temporary ban on export of scientific and technical publications to Iron Curtain countries, except to North Korea. To qualify for export under general license to any destination in the world except North Korea, publications containing scientific or technical data must: Be sold at newsstands or bookstores; be available by subscription or purchase to any individual without restriction; be approved for second-class mailing privileges by the United States government; or be freely available at public libraries. Details of the new procedure are set forth in Current Export Bulletin No. 637, issued as of Sept. 6.

The new procedure does not affect controls over the export of classified technical information; it still can't be sent outside the country without written permission of the agency which classified the data.

Orientation East . . .

Now that treaties of peace and alliance have been signed with Japan, many United States firms are interested in again doing business in that country. Those seeking help can get it by applying to the Far Eastern Division, Office of International Trade, Department of Commerce. This unit has a vast amount of data gathered by SCAP (Supreme Commander Allied Powers) during the years of occupation.

Patten Joins Coke Division . . .

Roy T. Patten was named a consultant in the Coke Division of the Defense Solid Fuels Administration. He is on leave as vice president, Republic Coal and Coke Co., Chicago.

Your Attention, Please . . .

The protests that businessmen usually voice when objectionable legislation is before Congress was lacking when the President called for repeal of the Capehart and Herlong amendments to the Defense Production Act. For some unknown reason businessmen who would be injured by such repeal are strangely quiet on the matter. In the meantime, hearings are being held on amending bills, including S. 2092, aimed at "clarifying" the Capehart amendment along lines suggested by Price Stabilizer Michael DiSalle. The Senate Banking & Currency Committee plans to report on the measure in time for a possible Senate vote before the end of September.

CINCINNATI

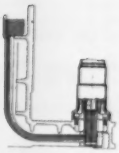
YOU'LL LIKE THESE

Family Features

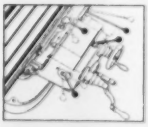
OF THRIFTY CINCINNATI MILLERS

Thrift is a family characteristic of CINCINNATI knee-type milling machines. They have many features that save you money year after year. The five illustrated here are common to all CINCINNATI ML, MI, Dial Type, High Power and Dual Power Dial Types. They constitute five reasons why it pays to equip your shop with Cincinnati's. Write for catalogs and then compare feature for feature with any other machine. You'll find that Cincinnati's are well worth waiting for.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



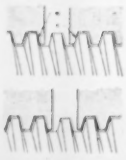
Cincinnati vertical screws never get stubborn and balky because they're automatically lubricated from an individual reservoir which you can fill with EP oil.



New men need no memory training course to operate a Cincinnati. As the lever is moved, so goes the feed motion; technically, it's independent directional control.

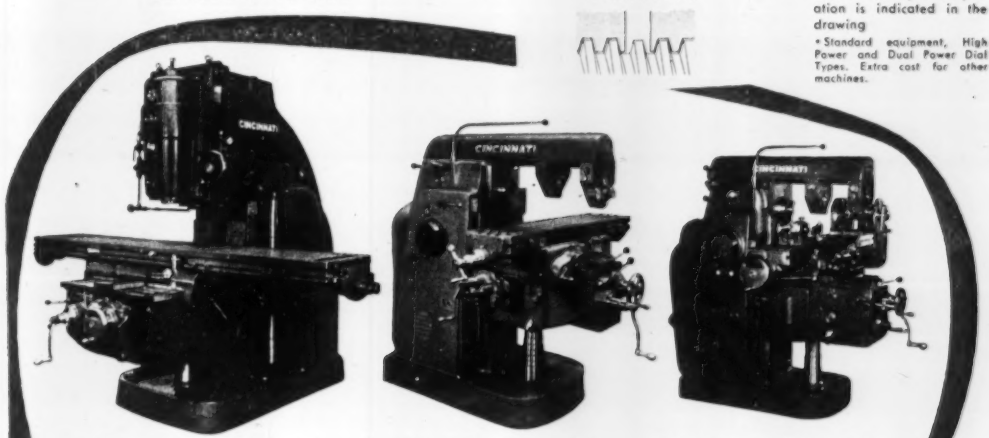
Soothing syrup to fretful cutting. Dynapoise overarms dampen out chatter; pay off in higher feed rates for many setups.

Hydraulic power does the work of shifting spindle speed gears . . . without effort, you can change spindle speeds as often as the job requires.



The villain of down-milling, backlash in the table feed screw is automatically eliminated.* The unit is built in. Principle of operation is indicated in the drawing.

*Standard equipment, High Power and Dual Power Dial Types. Extra cost for other machines.



The powerful group—High Power and Dual Power Dial Types—up to 50 hp for the largest size. No. 5 Vertical illustrated. Catalogs M-1644 and M-1647.

Intermediate power. Nos. 2, 3 and 4 High Speed Dial Types; Plain, Universal, Vertical. No. 2 Plain Dial Type illustrated. Catalog No. M-1623-3.

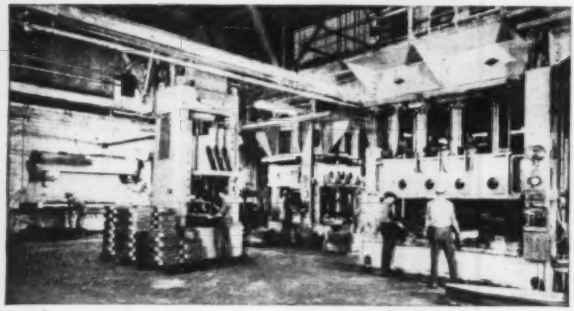
3 and 5 hp sizes, No. 2ML Plain and Universal, No. 2MI Plain, Universal and Vertical. No. 2MI Universal illustrated. Catalog No. M-1662-2.

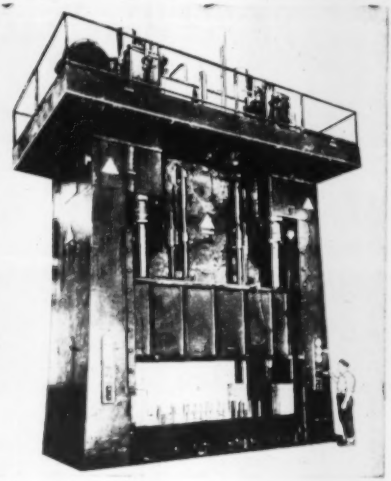
CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES
BROACHING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

Creative METAL STAMPINGS

from "MIGHTY BIG" presses



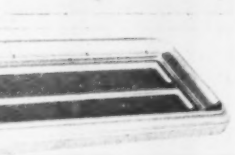


Above, *left to right: Dreis and Krump Press Brake, ¼" x 120" capacity; 750 ton single action Williams-White hydraulic press, 60" daylight opening, bed area 48" x 96", equipped with hydro-pneumatic cushion; 2,500 ton single action Lake Erie hydraulic press, 48" daylight opening, bed area 120" x 59" equipped with spring cushion; 750-250 ton double action Marson hydraulic press, daylight opening 69", bolster area 120" x 60", equipped with hydraulic cushion.*

Right: *Triple action Clearing hydraulic press, 750 ton ram capacity, 400 ton blankholder, 350 ton 3rd action, bolster area 150" x 72", daylight opening 94", stroke of ram 66", equipped with hydro-pneumatic cushion.*

½" thick x 39⅝" long x 8⅝" wide x 9⅛" deep. Weight 125 lbs. ➤

20 gauge x 46" long x 42" wide x 10" deep. Weight 22 lbs. ➤



18 gauge x 83" long x 28" wide x 4" deep. Weight 75 lbs. ▼

These giant presses are just a few of the many modern production machines at the Leake Stamping Company. Also available are numerous medium sized and small, high speed presses as well as complete supplementary facilities for heat treating, brazing, welding, carburizing, machining and testing. Equally important, Leake engineers are widely experienced in solving tough pressed metal problems, often involving the complete redesign of parts previously made by other production methods to adapt them to pressed metal fabrication.

This valuable experience is available to you for the asking. If you have parts that you feel might be made better or more economically from pressed metal, send samples or drawings to Leake engineers. They will investigate the possible advantages of the use of pressed metal in your particular problem. If pressed metal cannot readily be applied to your particular part, they will be frank in telling you so. If, on the other hand, your part is applicable to this modern production method, Leake will be glad to design and furnish quotations covering your requirements.

THE LEAKE ORGANIZATION

DESIGNING • ENGINEERING • DIE MAKING
COMPLETE PRESS ROOM • MACHINE SHOP
HEAT TREATING • BRAZING • WELDING
TESTING AND INSPECTION

THE LEAKE STAMPING COMPANY • MONROE, MICHIGAN

Shine on Jewelry Sales

Seasonal run starts in rough-and-tumble industry. '50 volume already surpassed

CHRISTMAS stocks of ornamental and costume jewelry will be plentiful this year, but only because a high-volume low-cost metalworking industry has been able to improvise with base metals, plating materials and manufacturing processes.

Some 1800 low-medium priced jewelry shops are starting a new seasonal run, turning out the bulk of their $180 million annual retail volume. They say orders will be filled—despite nearly every problem in production's book.

Struggles—Average piece of ornamental jewelry sells at $1 retail—yet requires close to 30 manufacturing processes, from die stamping or mold casting to plating or enameling. Presswork alone consumes 14 million production manhours annually. Fastening of components is largely a matter of soldering and brazing. Copper base alloys, wire and strip or slit sheets are most-used materials; steel is now getting a big play as No. 1 substitute. In even tighter supply than basic metal materials are nickel anodes and salts, chromium and other plating materials. Producers expect to get copper at a rate of 6600 tons annually over the next few months; fourth-quarter allocations include 1652 tons of copper and 100,000 pounds of aluminum. This tonnage includes watch cases, not classified as costume jewelry by the industry.

Marginal in interpretation, costume jewelry generally includes anything of metal worn for adornment although it may incidentally have utility purposes. Borderline novelties produced are insignia, emblems, fraternal pins and accessories for handbags, shoes and luggage. No kin to the precious jewelry business, ornamental jewelry makers use different materials, manufacturing processes and distribution channels.

New England Story—Total employment in the industry is 47,000. One-half of the 1800 shops hire less than 25 workers; 90 per cent are classed as small business. Concentration is heavy in the Providence, R. I.—Attleboro, Mass., area. Jewelry production is Rhode Island's second-largest industry, with 33,000 employed within a 15-mile radius of the state capitol in more than 400 plants.

High degrees of specialization have been attained in manufacture of costume jewelry with automatic machines a requisite for low-cost volume output. Findings and affiliated shops established for component and repair parts jobbing include electroplaters, job tool shops, spring makers, chain manufacturing specialists and enamelers. Small precision components are the industry's chief contribution to armament; many manufacturers are scurrying for government contracts, direct and sub, to make up for civilian cutbacks. Flexibility of workers for varied operations is important in each shop. About 90 per cent of the assemblers are women. A myriad of job designations reflect the specialization of the work: Linkers, chargers, toothpickers, pulverizers, firers, stoners and stringers are a few.

Jolly Roger—Geared to constantly changing fashions, the costume jewelry business may well be one of the most competitive in metalworking's domain. Approximately 75 per cent of volume is for women; design changes are more frequent and complicated than for men's accessories. No design is safe for long: If a hit at retail, any and all features are soon copied, with variations, and rushed into production. Competitively, few holds are barred. Appearance is top requisite for fast turnover; surface finishing is all-important.

Production, still largely seasonal, is becoming more evenly spread through the year. Stress on Easter, birthdays and special events helps spread production runs. Manufacturers of some lines did 60 per cent of 1950 volume in the first quarter of this year, operating double-shifts and allocating merchandise. The rush included considerable speculative forward buying, but raised producer sales to date above the total for all of last year. Prices increased an average of 25 per cent on most articles since Korea. Competition and high retail stocks prevent passing on increases in material and labor cost.

Steel Industry Shapes Rolling Capacities to Modern Needs

EXPANSION and improvement by steel companies increased their tonnage capacities in seven out of eight rolled products since 1948 (see the table). The score as of the beginning of this year: Hot-rolled sheet and strip capacity up almost 30 per cent; cold-rolled sheet and strip capacity up beyond 25 per cent; electrolytic tin plate capacity up 49 per cent.

Long Trails A-Winding—Data assembled by the American Iron & Steel Institute also show a 12 per cent gain in the capacity to produce heavy structural shapes and piling. As a result of the huge demand for natural gas transmission lines, capacity for making electric-weld pipe and tubing jumped 153 per cent, from 2 million tons to over 5 million. Total capacity for all types of pipe and tubes, including electric-weld, rose 43 per cent.

In the period between 1948 and the beginning of 1951 the increase in raw steel capacity was over 10.2 million tons; annual capacity for making all types of finished hot-rolled products increased about 9.7 million tons. That figures up to an increase of 11 per cent in steel capacity, 13 per cent in hot-rolled capacity. Total capacity for hot-rolled finished products at the beginning of this year was over 84 million tons, equivalent to 80 per cent of the raw steel capacity of 104.5 million tons, compared with 78.7 per cent in 1948.

More on Less—With seven fewer open-hearth furnaces, steel companies at the start of this year had 7.7 million tons more open-hearth capacity than in 1948. Total open-hearth capacity at the start of this year was around 91.3 million tons.

In the same three-year period, 34 new electric furnaces were added. They increased total electric furnace capacity over 40 per cent to 7.6 million tons from 5.4 million tons. Steelmaking furnaces totaled up to 1245 from 1216; blast furnaces to 250 from 239.

Present record high capacities of the industry are scheduled to spiral even further under programs costing more than $2.5 billion in 1951 and 1952.

Capacity Changes Since '48

Rolled Products	Capacity—Net Tons 1948	1951
Hot-Rolled Sheet, Strip*	26,589,460	34,492,310
Cold-Rolled Sheet, Strip	11,413,785	14,324,170
Pipe, Tubing	8,778,720	12,576,170
Heavy Struct. Shapes, Piling	5,484,330	6,137,450
Plates	7,865,700	8,260,580
Tin, Terne Plate†	5,890,250	6,453,340
Hot-Rolled Bars**	12,008,260	11,977,810
Wire Rods	6,195,170	6,360,350

*Includes strip for cold-reduced black plate and tin plate. †Electrolytic and hot-dipped.
**Not including concrete reinforcing bars
Note: This table does not cover all steel products

Defense Program Alters Steel Distribution Pattern

Auto industry gets a smaller proportion of mill shipments, while ordnance and rail transportation groups receive more

THE DEFENSE program unmistakably left its imprint on the steel distribution pattern of the first half of 1951.

The automotive industry, restricted by government regulations, lost some of its stature as the biggest consumer of steel, while ordnance and other military users increased their steel intake. Also clearly evident in the pattern is the rise in tonnage channeled to railroad freight car makers for their use in meeting government-set goals.

For the Record—The change occurred while the nation's steel mills were setting a new record for tonnage distributed in a half-year.

Tabulating a record amount (40,005,921 net tons), the American Iron & Steel Institute found the automotive industry received mill shipments of 6,988,505 tons, or 17.47 per cent of all steel shipped from mills in the first half. Although this proportion is a decline from the 20.04 per cent the auto industry received in all of 1950, the auto makers still rank as the No. 1 consumer of steel.

Warehouses received a slightly larger portion of the mills' first-half shipments than the automotive industry but warehouses are distributors, not consumers. Mill shipments to warehouses accounted for 7,109,103 tons, or 17.77 per cent.

More for Guns—The step-up in the defense program sent 464,367 tons of steel from mills to the classification of ordnance and other military during the first half of 1951. This tonnage represented 1.16 per cent of mill shipments. In all of 1950, ordnance and other military requirements took 0.27 per cent of the steel mill

DISTRIBUTION OF FINISHED STEEL PRODUCTS

In net tons of products of all grades, including alloy and stainless.

Market Classification	Ingots, Blooms, Billets, Slabs, Sheet Bars, and Seamless Tube Rounds	Skelp	Wire Rods	Structural Shapes (Heavy)	Steel Piling	Plates	Standard Rails (over 60 lb)	Rails (all other)	Joint Bars	Tie Plates
Converters, Processors	622,461	20,198	160,977	1,221	.....	220,071	5	2	2,520	5
Forgings (except automotive)	440,695	.....	1,560	.....	.....	6,220	.....	.....	.....	.....
Bolts, Nuts, Rivets, Screws	11,042	.....	149,657	.....	.....	6,340	.....	.....	.....	.....
Jobbers, Dealers, Distributors	51,707	968	38,863	420,783	11,138	486,637	2,444	7,658	1,010	554
Construction, Maintenance	80,493	284	10,461	1,268,345	169,522	815,232	46,483	7,921	1,833	5,492
Contractors' Products	3,795	.....	17,261	6,119	.....	67,852	.....	.....	.....	.....
Automotive	242,611	.....	16,142	25,350	.....	259,147	.....	.....	.....	.....
Rail Transportation	28,411	.....	119	348,954	355	818,049	747,496	11,120	57,669	217,295
Shipbuilding, Marine Equipment	2,452	.....	41	64,684	3,900	254,897	540	244	.....	.....
Aircraft	9,127	.....	77	1,713	.....	5,862	.....	.....	.....	.....
Oil and Gas Drilling	32,688	.....	2	20,960	82	82,181	.....	.....	.....	.....
Mining, Quarrying, Lumbering	1,388	.....	50	15,111	171	43,669	10,355	23,001	2,024	1,732
Agricultural	19,468	.....	5,964	27,666	.....	77,275	.....	.....	.....	.....
Machinery, Industrial Equip., Tools	74,089	.....	25,561	130,497	.....	480,503	6,872	3,660	236	.....
Electrical Machinery and Equipment	1,143	.....	4,736	15,300	.....	66,699	.....	.....	.....	.....
Appliances, Utensils, Cutlery	645	.....	1	571	.....	6,846	.....	.....	.....	.....
Other Domestic and Commercial Equip.	1,379	.....	4,539	1,322	.....	8,523	.....	.....	.....	.....
Containers	4,092	.....	613	745	.....	13,739	.....	.....	.....	.....
Ordnance and Other Military	27,988	.....	363	15,042	86	90,607	1,002	.....	.....	1
Export	18,144	47,624	2,789	93,311	14,849	63,643	40,840	1,142	3,548	8,958
Unclassified	42,637	.....	4,829	7,427	.....	14,608	.....	12,492	636	.....
Total	1,716,455	69,074	444,605	2,465,122	200,103	3,888,600	856,037	67,240	69,476	234,037

Market Classification	Mechanical Tubing	Pressure Tubing	Wire, Drawn	Nails and Staples	Wire, Barbed and Twisted	Woven Wire Fence	Bale Ties	Black Plate	Tin and Terne Plate (hot-dipped)	Tin and Terne Plate (electrolytic)
Converters, Processors	5,271	1,135	563,199	254	117	7	22	2,404	51	265
Forgings (except automotive)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bolts, Nuts, Rivets, Screws	11	.....	199,033	.....	.....	.....	.....	.....	.....	.....
Jobbers, Dealers, Distributors	86,367	36,978	180,083	403,000	102,110	219,947	49,475	56,278	20,628	37,075
Construction, Maintenance	9,379	6,191	24,618	10,182	3,130	2,896	244	4,356	1,042	1,817
Contractors' Products	18,736	6,040	32,791	587	134	18	.....	19,099	1,623	367
Automotive	84,464	373	168,933	583	.....	.....	.....	9,368	1,102	1,585
Rail Transportation	2,547	4,033	1,618	3,930	525	959	.....	36	170	19
Shipbuilding, Marine Equipment	536	1,297	309	15	.....	.....	.....	.....	10	28
Aircraft	4,612	407	1,232	49	.....	.....	.....	.....	.....	66
Oil and Gas Drilling	3,944	272	52	8	.....	.....	.....	.....	123	.....
Mining, Quarrying, Lumbering	1,456	.....	817	517	13	27	.....	39	.....	.....
Agricultural	18,071	27	14,086	489	59	68	.....	55	16	695
Machinery, Industrial Equip., Tools	124,642	36,077	77,358	2,665	.....	.....	.....	2,822	3,481	4,647
Electrical Machinery and Equipment	6,655	453	46,650	357	.....	.....	.....	2,676	545	362
Appliances, Utensils, Cutlery	5,592	2,725	27,021	176	.....	.....	.....	40,574	7,127	7,708
Other Domestic and Commercial Equip.	34,257	44	198,123	707	.....	.....	.....	47,769	6,058	2,328
Containers	1,619	.....	59,626	10,457	24	.....	2,400	285,724	615,225	1,278,854
Ordnance and Other Military	13,250	226	2,100	3,399	493	160	99	64	6,021	72
Export	4,144	2,852	28,408	5,860	8,752	1,646	27	15,734	191,079	89,923
Unclassified	66,413	45,836	68,220	4,744	.....	19	137	.....	.....	.....
Total	491,966	144,966	1,694,277	447,979	115,357	225,747	52,404	486,998	854,301	1,425,811

shipments. This percentage represented only 194,614 tons.

Emphasis on the freight car building program contributed largely to the increase in mill shipments of steel to the classification of rail transportation. In the first half of 1951 it received 3,167,987 net tons, or 7.92 per cent of all mill shipments. In all of 1950, it received 5.95 per cent, or 4,299,346 tons.

The automotive industry was the largest consumer in the first half of 1951 of carbon steel, its receipts of this product totaling 5,945,092 net tons out of 36,804,944 tons shipped by mills. Warehouses, however, received a greater amount, 6,836,451 tons.

Tops Again—As a consumer of alloy steel (other than stainless), the automotive industry was the largest. Of the 2,925,962 tons of alloy steel shipped by mills, the automotive industry took 1,000,042 tons.

The automotive industry also was the largest consumer of stainless steel. It received 43,371 net tons of the total of 275,015 tons shipped from mills in the first half.

Additional details of the first-half distribution follow:

Where Alloy, Stainless Steel Went
(First Half of 1951)

	Alloy (other than stainless) net tons	Stainless net tons
Converters, Processors	44,696	22,397
Forging (except automotive)	335,218	7,942
Bolts, Nuts, Rivets, Screws	54,688	3,347
Jobbers, Dealers, Distributors	214,053	58,599
Construction, Maintenance	55,871	6,219
Contractors' Products	15,971	7,231
Automotive	1,000,042	43,371
Rail Transportation	146,639	2,686
Shipbuilding, Marine Equipment	9,939	640
Aircraft	30,056	15,802
Oil and Gas Drilling	76,367	961
Mining, Quarrying, Lumbering	12,388	336
Agricultural	34,022	157
Machinery, Industrial Equip., Tools	329,677	21,870
Electrical Machinery and Equipment	267,128	10,372
Appliances, Utensils, Cutlery	22,413	26,003
Other Domestic and Commercial Equip.	14,000	7,779
Containers	9,904	1,734
Ordnance and Other Military	112,476	3,715
Export	48,971	4,038
Unclassified	101,443	29,856
Total	2,925,962	275,015

BY MARKET CLASSIFICATION IN FIRST HALF OF 1951

Tables compiled by STEEL from American Iron & Steel Institute figures.

Track Spikes	Wheels	Axles	Bars, Hot-Rolled (and light shapes)	Bars, Concrete Reinforcing	Bars, Cold-Finished	Bars, Tool Steel	Standard Pipe	Oil Country Goods	Line Pipe	Market Classification
20	.....	.....	94,238	514	7,413	970	4,642	1,068	219	Converters, Processors
.....	.....	.....	271,935	.....	1,685	437	.....	.....	.....	Forgings (except automotive)
.....	.....	.....	315,625	.....	58,368	6	.....	.....	.....	Bolts, Nuts, Rivets, Screws
5,403	5	.....	621,306	433,316	241,790	15,133	1,028,075	673,810	310,998	Jobbers, Dealers, Distributors
1,450	2,934	663	281,345	387,313	5,242	150	85,117	17,872	963,477	Construction, Maintenance
.....	.....	.....	133,170	11,594	9,655	23	80,546	.....	5,613	Contractors' Products
.....	.....	.....	1,311,389	.....	236,485	192	2,215	.....	25	Automotive
73,196	189,700	113,427	259,234	2,020	5,275	76	14,135	.....	314	Rail Transportation
.....	192	.....	29,089	178	1,684	11	7,740	.....	8,658	Shipbuilding, Marine Equipment
.....	.....	.....	13,615	.....	11,460	19	596	.....	19	Aircraft
.....	.....	.....	60,765	49	4,283	8	6,735	167,586	27,648	Oil and Gas Drilling
1,555	1,042	50	47,939	1,381	2,841	212	3,227	4,634	2,572	Mining, Quarrying, Lumbering
.....	.....	.....	295,267	77	52,508	42	17,990	.....	1,054	Agricultural
88	4,983	693	406,205	.....	170,483	11,444	30,389	724	15,042	Machinery, Industrial Equip., Tools
.....	3	.....	58,263	.....	18,867	95	115,962	.....	955	Electrical Machinery and Equipment
.....	.....	.....	12,510	.....	24,089	345	6,216	.....	45	Appliances, Utensils, Cutlery
.....	.....	.....	52,352	7	26,264	101	2,183	.....	317	Other Domestic and Commercial Equip.
.....	.....	.....	7,369	.....	19	.....	2,776	9	519	Containers
194	5	.....	67,780	40	36,264	53	2,608	.....	1,406	Ordnance and Other Military
3,367	587	124	48,689	29,125	3,685	119	53,456	77,963	152,487	Export
.....	.....	.....	73,112	53,267	44,745	54,589	.....	.....	.....	Unclassified
85,273	199,451	114,957	4,461,197	918,881	963,105	84,025	1,464,608	943,666	1,491,368	Total

Sheets, Hot-Rolled	Sheets, Cold-Rolled	Sheets, Galvanized	Coated Sheets (all other)	Enameling Sheets	Electrical Sheets and Strip	Strip, Hot-Rolled	Strip, Cold-Rolled	Net Total	Per Cent of Total	Market Classification
180,093	47,174	15,896	1,065	391	.....	133,975	42,854	2,130,717	5.32	Converters, Processors
.....	.....	.....	.....	.....	.....	.....	.....	722,532	1.81	Forgings (except automotive)
31,465	2,675	134	.....	.....	.....	4,194	6,438	784,988	1.96	Bolts, Nuts, Rivets, Screws
567,777	461,720	373,603	18,208	1,719	3,255	83,251	56,031	7,109,103	17.77	Jobbers, Dealers, Distributors
232,268	75,379	94,022	1,161	1,285	.....	37,167	15,943	4,672,709	11.68	Construction, Maintenance
364,901	321,019	256,073	8,082	18,277	861	68,446	93,438	1,546,120	3.87	Contractors' Products
1,316,279	2,563,708	17,693	65,077	730	5,402	334,277	325,375	6,988,505	17.47	Automotive
175,995	13,529	41,151	44	35	9,604	24,915	2,032	3,167,987	7.92	Rail Transportation
10,581	2,890	7,314	61	3	13	1,474	58	398,900	0.99	Shipbuilding, Marine Equipment
6,711	7,284	525	107	.....	590	348	2,935	67,354	0.17	Aircraft
25,109	538	249	.....	.....	80	528	60	433,950	1.08	Oil and Gas Drilling
9,581	1,244	1,552	46	.....	135	2,504	573	181,458	0.45	Mining, Quarrying, Lumbering
115,162	46,521	59,596	2,853	513	43	56,928	3,838	816,331	2.04	Agricultural
199,807	54,825	15,564	5,366	275	3,249	67,758	59,268	2,019,273	5.05	Machinery, Industrial Equip., Tools
112,482	115,678	12,753	3,853	1,994	324,655	38,165	65,744	1,015,045	2.54	Electrical Machinery and Equipment
150,433	516,194	45,133	15,035	79,129	16,335	14,213	89,201	1,067,864	2.67	Appliances, Utensils, Cutlery
101,363	369,800	21,269	3,500	2,847	2,032	37,049	146,793	1,070,926	2.68	Other Domestic and Commercial Equip.
437,371	322,143	27,822	2,382	321	.....	121,524	95,494	3,290,867	8.23	Containers
81,360	75,940	3,644	1,432	7	467	19,124	13,070	464,367	1.16	Ordnance and Other Military
102,015	85,437	31,991	3,948	1,110	22,623	21,226	12,793	1,294,018	3.23	Export
148,158	136	1,134	.....	285	70	59,520	59,893	762 907	1.91	Unclassified
4,368,911	5,083,834	1,027,118	132,220	108,921	389,414	1,126,586	1,091,831	40,005,921	100.00	Total

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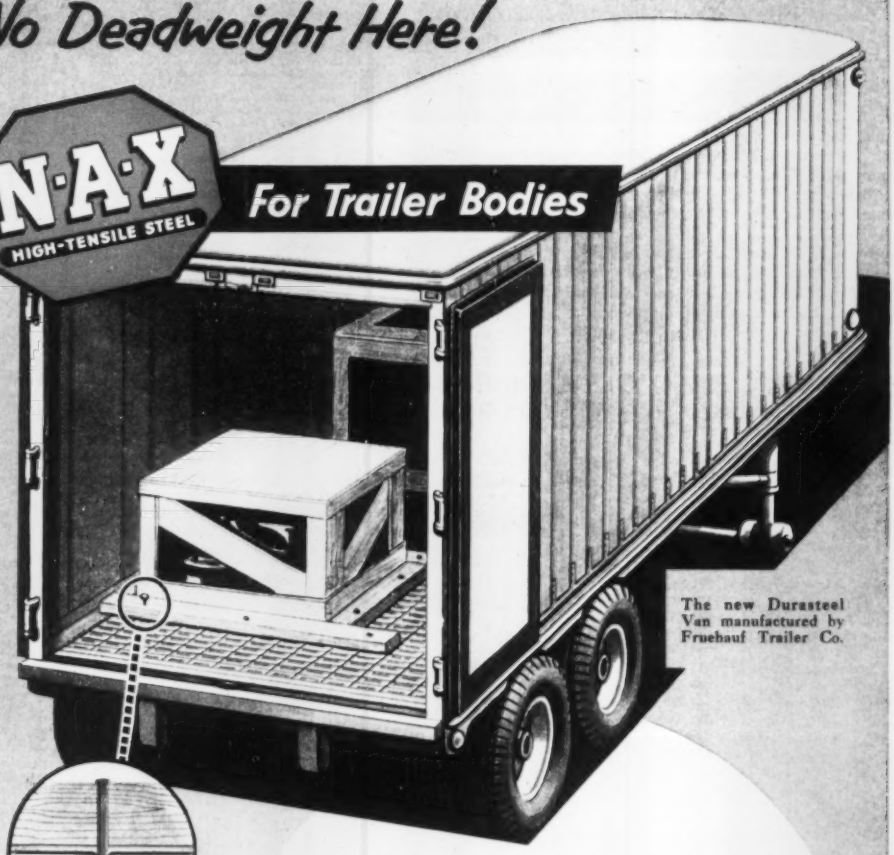

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By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Because automobile demand has been low since early spring, the people whose livelihood depends on automobiles are wondering: What will public reaction be to price hikes?

DETROIT

UPPERMOST IN the minds of many whose livelihood depends upon the automotive industry is the effect higher prices will have on the public. Demand for many makes of cars has been, to put it charitably, apathetic throughout the spring and summer months. Price hikes by the big three, though, was a foregone conclusion. Early in December Ford, General Motors, Chrysler and Nash tried to raise prices and were ordered by the Economic Stabilization Agency in a not-soon-to-be-forgotten-or-forgiven action to roll their prices back to the Dec. 1 level. It meant in some cases that 1951 car prices were the same as in early 1949. The action made one maker—General Motors—so mad it froze the sale of new cars for a short period.

Interim Attempt—On Mar. 2 the Office of Price Stabilization relented a little, permitted car makers to boost their prices 3½ per cent. Michael DiSalle at that time said the increase, smaller than the several makers had previously instituted, was only an interim attempt to give partial relief and was "substantially less than the actual dollar increases in direct labor and materials costs" which had taken place before the freeze. Since that time only Chrysler was granted any measure of relief, the OPS deciding models equipped with the new 180-hp engine were not counterparts of 1950 models and were entitled to further increases.

Good Evidence—When the Capehart amendment to the Defense Production Act cleared the way for increases that would reflect higher costs up to the present, all makers submitted figures indicating a need for approximately 9 to 10 per cent higher prices. A number of makers had good evidence to support the belief they were only after higher ceiling prices and would not raise their selling prices that much if any. OPS' order of Sept. 7 neatly bypassed the Capehart amendment and established a formula permitting new wholesale prices to be established by each manufacturer only in cognizance of higher materials costs to Dec. 31, 1950, and increased labor costs to Mar. 15. The administration is hopeful it can get the Capehart amendment scratched off the books, but if it can't the automakers still have hopes they will be able to recoup a greater part of their cost increases.

Chrysler and Ford were in the forefront to get their allowable price increases under the formula on file with OPS. For Chrysler-built cars (outside of those models, prices of which had been advanced on May 28 and July 10) the new wholesale prices average approximately 6.5 per cent higher which would push factory retail prices up $108 on a Plymouth model, $117 on a Dodge, $147 on DeSoto and $156 on the Chrysler Windsor Deluxe four-door. Ford's proposed wholesale price increases, made public by OPS, are to be 4.31 per cent for Fords, 2.83 per cent for Mercurys, and 2.5-3.87 per cent for Lincolns. General Motors, as has been its wont since the December fiasco, was slow to file for the increase, but it was expected to follow suit by weekend. What might be expected from some of the independents was indicated by Packard, whose executive vice president, Leroy Spencer, said it would not increase prices at the present time. With only a few exceptions the smaller manufacturer upped their 1951 model prices at introduction time about a year ago and have looked forward to an increase in the price level for cars of Big Three make.

Attention: Walter Reuther

There was some speculation around Detroit last week about the reaction to the price hikes from Walter Reuther's headquarters. UAW has been quick in the past to jump on manufacturers for increasing their prices and last December called the attempted increases "totally unjustified and unnecessary." Referring specifically

LAND-SEA-AIR: Side-by-side at Chrysler's Plymouth division plant in Evansville, Ind., are automobiles and hulls for Grumman Albatross air rescue planes. Blending of defense work with civilian production is this plant's formula for full operations. Workers are moving the completed cabin section of the plane to final assembly as a Plymouth car made in the same plant gets a final check

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to General Motors at that time, Reuther said the company could have absorbed all its materials price increases and its increased labor costs and still have made a tremendous profit. Could be that what K. T. Keller, Chairman of Chrysler Corp., told its stockholders last week will make an impression on the UAW's chieftain. Net profit during the first six months of this year was only 2.57 per cent of sales, he reported. Car and truck sales for the period totaled 804,884 units. In 1949 when 1,267,470 cars and trucks were sold net profit was 6.34 per cent of sales. In 1950 when 45,769 more units were sold the year's net profit dropped to 5.84 per cent of sales.

Military Helps Detroit Labor

What has been done to keep Detroit's unemployment total from reaching the disastrously high levels which had been predicted as soon as automobile production cuts began to be felt? The best answer is to be found in two reports made public by Sen. Blair Moody and written by Munitions Board Chairman John D. Small to Mobilization Director Charles E. Wilson. They disclose that during July and August contracts totaling in excess of a half billion dollars were awarded to Detroit companies. The Army's portion of this total was $388 million, Small said, and Air Force prime contracts only amounted to $109 million. New Navy contracts were in excess of $60 million. About $250 million of the total is for additional orders of materiel which is already in production in the area. The real weight of many of these contracts, production and employment-wise, will begin to be felt in fourth quarter. In 1952 they will assume major proportions.

Several of the contracts require the building and equipping of new plants, but enough are for work similar to that being done now that "the effect should almost immediately be felt in the labor markets," said Mr. Small.

Two men—Walter Reuther and Blair Moody—can take the lion's share of the credit if severe unemployment is in fact averted in Detroit, Moody for his investigations into conditions with respect to contract letting and Reuther for his persistence in getting the situation in auto building plants laid before Washington authorities. How effective their efforts have been is exemplified by the fact that Mobilizer Wilson insists that these reports be made every two weeks.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,853	746,801
August	570,597*	842,335
September	.....	760,847
October	.....	796,010
November	.....	833,784
December	.....	671,622

Week Ended	1951	1950
Aug. 18	129,661	190,879
Aug. 25	139,115	179,042
Sept. 1	137,479	188,072
Sept. 8	103,711	151,606
Sept. 15	135,000*	185,421

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary.

GM's New Technical Center Open

One place where work for the services has already reached a startlingly high level is at General Motors' new technical center north of Detroit at Mound and Twelve Mile Roads. Headed by GM Vice President Charles A. Chayne, its staff consists of about 450 employees, nearly half of whom are engaged in five engineering development groups—car, structure and suspension, transmission, power plant and automotive ordnance. "Well over 50 per cent of the work being done at the present time is for defense," Mr. Chayne told newsmen when he conducted them through the beautifully efficient new facilities. All five groups are engaged in varying degrees with military work, and discussion of most of it is *verboten*. Two new types of military vehicles developed by the automotive ordnance group, however, have been cleared and are on production contracts at GM divisions. These are the amphibious "otter" which Pontiac will make and the new 6 by 6 truck from GMC Truck & Coach. A third vehicle is being designed for production. The power plant group is working on special engines and accessories for ground vehicles and aircraft, and the transmission group is engaged in engineering of military automatic transmissions.

Continental Buys Turbine Rights

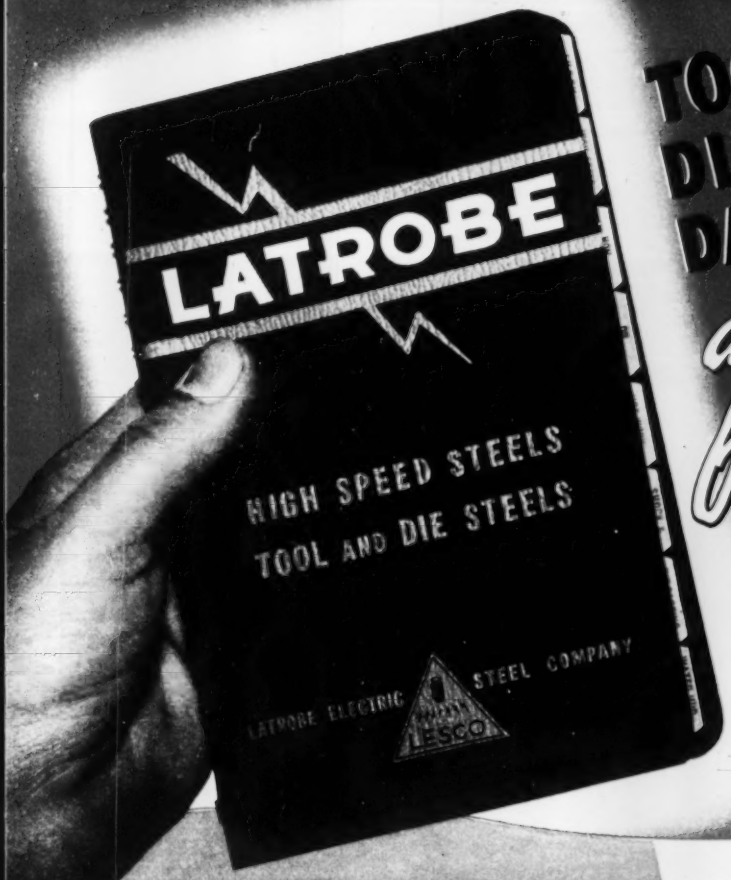
Exclusive manufacturing rights in the United States to a family of nine gas turbines was bought by Continental Motors Corp. from Societe Turbomeca, Bordes, France. The turbines were developed under sponsorship of the French air ministry and range in horsepower from 200 to 1100, C. J. Reese, Continental president, says. They will have such immediate military applications as guided missile, helicopter, target plane and utility aircraft propulsion. He predicts that they will make possible increases far beyond present limits in the capacity, speed and usefulness of medium-size commercial aircraft and certain types of industrial equipment.

Initial production of the power plants will be at Continental's subsidiary, Continental Aviation & Engineering Corp. in Detroit.

Outstanding feature of the engines is their 100 per cent more favorable power-to-weight ratio than reciprocating engines have. One model, installed in a four-place plane, enables it to cruise at about 300 mph, compared with about 170 mph for a similar plane equipped with a piston-driven engine. Power take-off from the turbine can be achieved by various means in addition to the conventional jet reaction. The fact that no columbium, cobalt or tungsten is contained in these turbines makes the announcement more spectacular.

Pressure Recorder Described

A G.M.-developed pressure indicating instrument, described to the National Instrument Conference in Houston last week, is believed to have applications far greater than first thought. The condenser-type indicator is adaptable for recording pressures as high as 20 000 psi or of extreme minuteness. Changes in pressures become visible on the screen of a cathode ray oscilloscope.



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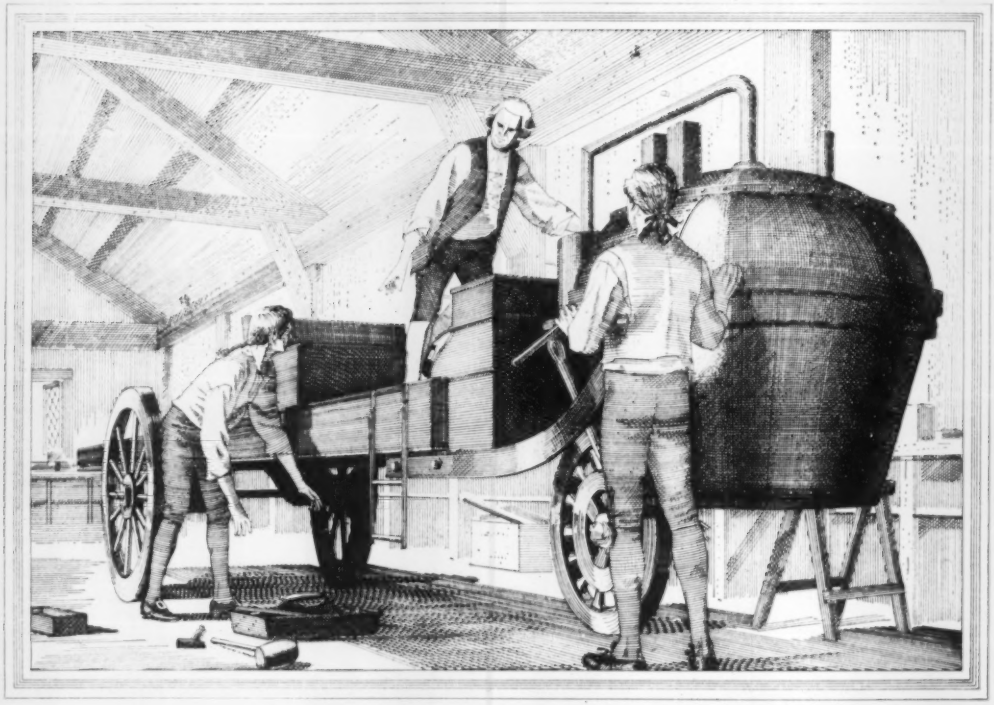


It took craftsmanship to build locomotives by hand!

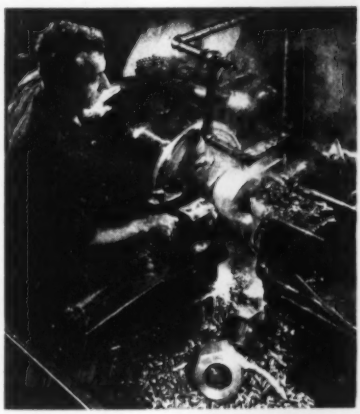
The French inventor, Nicholas Cagnot, had no other choice.

In 1769, machines were not available to help him build his pioneer steam locomotive . . . with a speed of four miles per hour, and a stop every fifteen minutes to build pressure.

Cagnot applied his craftsmanship to every part, including the bolts and nuts. He gave great heed to forming his fasteners, knowing that the strength of his entire assembly rested on them.

Makers of modern locomotives are even more aware of the need for quality fasteners. They know fine fasteners are vital to today's stepped-up production . . . to speed and strengthen assembly, save scarce materials by reducing wasteful rejects. Fortunately, these contemporary craftsmen have *specialists* to aid them, like the RB&W worker in the illustration. He specializes in fasteners alone, devoting a craftsman's skill to producing bolts, nuts, screws and rivets of uniform accuracy, dependability and physical properties . . . backed up by 106 years of RB&W experience in making the finest fasteners.

We're working full speed to make strong the things that make America strong. We welcome your fastener problems. Address your inquiries to RB&W at Port Chester.



RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

RB&W *the complete quality line*

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Plants at: PORT CHESTER, N. Y., CORAOPOLIS, PA., ROCK FALLS, ILL., LOS ANGELES, CALIF. *Additional sales offices at:* PHILADELPHIA, DETROIT, CHICAGO, DALLAS, OAKLAND. *Sales agents at:* PORTLAND, SEATTLE. *Distributors from coast to coast.*

The Business Trend

Drop in industrial output because of holiday work pause still leaves activity index at double the prewar production rate for a full week

MOMENTUM gained by industry at the turn of the month carried it over the Labor Day hump without appreciable loss of speed.

Subtracting one day from the work week naturally caused total output to slump, but not so much as would be expected in normal times. Measured by STEEL's industrial activity index, production for the week ended Sept. 8 showed a drop of 16 percentage points from the week before. Its reading was 199 per cent of the 1936-1939 average.

Sign of the tremendous increase in the nation's productive capacity since prewar years is seen in that figure. Industry in a holiday week turned out twice as many goods as it did in a normal week before the war.

Index for the latest period shows all components dropped because of the layoff. Automobile assemblies showed the most effect, followed in order of decline by carloadings, electric power output and steelworks operations. A year ago the index registered 202 for the same period, but there were fewer controls holding down production of consumer goods. Last week's pick-up in activity was expected to return the index to its normal level.

Steel Back to Capacity . . .

Return to capacity operations by the steel mills will boost the index a few points. American Iron & Steel Institute says schedules for last week were calculated to produce 1,999,000 tons of ingots and steel for castings. Yield in the week ended Sept. 8 was 1,965,000 tons—44,000 tons more than were produced the year before.

Current Is On . . .

Sustaining the activity index by record-breaking output in recent weeks has been the electric power industry. Since the last week in July, distribution of electric energy has surpassed the 7 billion kilowatt-hours mark. For the Labor Day week ended Sept. 8, output dipped below that mark to 6795 million kilowatt-hours, Edison Electric Institute reports. Total sales of electrical energy by the electric light and power industry in 1951 is running better than 15 per cent over last year. First half generation by fuelburning and water power plant totaled 179.6 billion kilowatt-hours, compared to 156.8 billion in 1950's first half.

More Trucks, Fewer Cars . . .

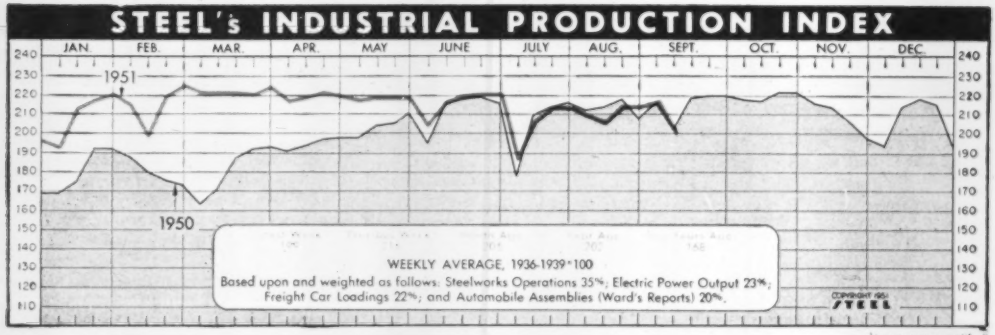
A cut of 25 per cent in auto assemblies was reported by *Ward's Automotive Reports* for the week ended Sept. 8. The one-day shutdown would have warranted a drop of about 20 per cent from a week earlier. *Ward's* scoreboard showed U. S. and Canadian assemblies of passenger cars and trucks amounted to 103,711 in that period. A cheering note is seen in truck production: Daily output has hovered near 5500 units for two weeks, and truck volume so far this year is some 13 per cent ahead of the 1950 record-breaker.

Role of Freight Cars . . .

With few exceptions, revenue freight car loadings in the past two

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	99.0	100.0	102.0	98.5
	Electric Power Distributed (million kilowatt hours)	6,795	7,146	7,070	6,029
	Bituminous Coal Production (daily av.—1000 tons)	1,756	1,800	1,667	1,843
	Petroleum Production (daily av.—1000 bbl.)	6,220	6,232	6,231	5,909
	Construction Volume (ENR—Unit $1,000,000)	$160.5	$257.4	$216.9	$256.1
	Automobile and Truck Output (Ward's—number units)	103,711	137,479	97,352	151,606
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	740†	829	809	751
	Business Failures (Dun & Bradstreet, number)	116	164	149	145
	Currency in Circulation (in millions of dollars)‡	$28,262	$28,034	$27,904	$27,259
	Department Store Sales (changes from like wk. a yr. ago)‡	−3%	−3%	−14%	+5%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$12,056	$13,962	$14,656	$12,793
	Federal Gross Debt (billions)	$256.8	$256.6	$255.6	$257.8
	Bond Volume, NYSE (millions)	$12.4	$10.9	$11.9	$13.4
	Stocks Sales, NYSE (thousands of shares)	7,453	7,357	7,580	5,855
	Loans and Investments (billions)†	$70.5	$70.3	$70.1	$68.6
	United States Gov't. Obligations Held (millions)†	$30,930	$30,983	$30,997	$35,082
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.99
	STEEL's Nonferrous Metal Price Index‡	224.6	224.6	224.6	210.6
	All Commodities†	176.7	176.8	177.8	168.3
	Metals and Metal Products†	188.2	188.2	188.1	175.2
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				



Week ended Sept. 8

months have been well under the levels of last year's comparative figures. But for the entire year to date, car loadings are about 8 per cent over 1950's rate and almost 7 per cent higher than 1949's.

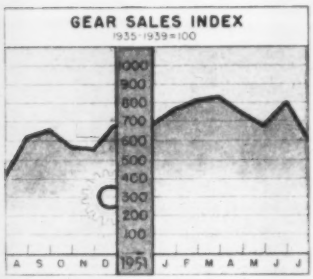
Shortage of freight cars could be hindering transportation of industrial and agricultural products. August deliveries of 7183 new domestic freight cars helped, but backlog of 139,014 going into September represents nearly 20 months' production at that pace. Most companies have their orders in though: Only 1828 new units were ordered in August, and backlog has been heading downhill slowly since March.

Fuel for the Fires . . .

Barring another strike, there'll be plenty of coal for industry this winter. Stocks of bituminous in August added up to 74.1 million tons—a 71-day supply at current consumption rates. Biggest effect of the UMWA miners holiday in July was lowering of stocks 1 per cent from their eight-year peak in July. All bituminous stockpiles held by industrial users dropped in the month, except for electric power utilities. July consumption by industry was higher than a year before but somewhat lower than June's. Total July consumption of bituminous was 32,377,000 tons. Currently, production of soft coal is a little below the 1950 rate: 10,535,000 tons were mined in the week ended Sept. 1, about 500,000 tons below the same week last year.

Building: $19.5 Billion . . .

This year may not be so bad for home building after all. That's the opinion of the National Association of Home Builders, which has come out with a revised view on the number that will be built. Its new estimate of 850,000—the goal Federal housing planners set as a safe limit for the materials market—is just about double its earlier forecast, when

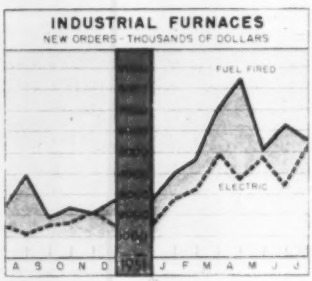


Gear Sales Index

1935-1939=100

	1951	1950	1949
January	764.6	280.2	320.7
February	809.1	272.9	282.3
March	839.7	258.4	290.1
April	742.5	328.6	339.9
May	697.1	263.1	260.1
June	806.9	401.0	227.8
July	589.1	410.7	193.1
August		617.4	262.9
September		654.5	224.9
October		564.8	242.3
November		551.9	230.7
December		680.4	242.8

American Gear Mfrs. Association

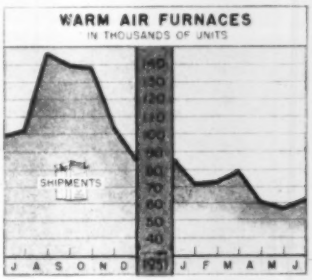


Industrial Furnaces

New Orders—Thousands of Dollars

	Fuel Fired*		Electric	
	1951	1950	1951	1950
Jan.	3,033	1,914	2,764	473
Feb.	1,670	616	3,212	697
Mar.	7,919	1,300	4,846	753
Apr.	8,497	837	3,657	415
May	5,044	1,302	4,766	982
June	6,250	1,166	3,370	1,328
July	5,327	2,247	5,363	1,445
Aug.		3,927		1,039
Sept.		1,817		1,485
Oct.		2,396		1,603
Nov.		2,168		2,157
Dec.		2,749		1,595

* Except for hot rolling steel.
Industrial Furnace Mfrs. Assn.



Warm Air Furnaces

Shipments in Units

	1951	1950	1949
Jan.	71,143	39,887	31,734
Feb.	71,966	45,618	33,011
Mar.	79,239	59,982	41,271
Apr.	60,337	58,798	34,471
May	56,242	78,349	42,406
June	61,889	98,517	55,916
July		102,189	48,575
Aug.		145,512	85,320
Sept.		139,014	112,264
Oct.		137,915	103,401
Nov.		102,891	79,280
Dec.		85,407	52,323
Total		1,093,189	719,972

U. S. Bureau of the Census

Charts—Copyright 1951, STEEL

it saw credit controls and mortgage money scarcities cutting into homebuilding.

Expenditures for new construction in August totaled $2.8 billion, about the same as July. Compared with August, 1950, it was a significantly smaller physical volume of work put in place when dollars are adjusted for increase in construction costs. Private industrial construction increased by 4 per cent over July and was double the August, 1950, volume. For the first eight months of the year, expenditures for new construction totaled $19.5 billion, almost 12 per cent over the same period in 1950.

Hiring at Prewar Rate . . .

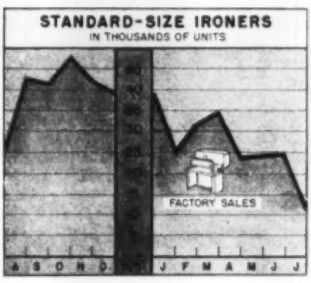
Factory hiring dropped in July to its lowest rate since before the war, Department of Labor figures show. The hiring rate was reduced from 49 to 42 per 1000 employees between June and July. Decreases were reported in nearly all industry groups. The figures mirror throttling of consumer goods output as well as widespread vacation shutdowns. Increased lay-offs accompanied the drop in hiring. The lay-off rate rose from 10 to 17 per 1000 between June and July. A lot of these lay-offs represented short-term separations of workers not eligible for vacation pay when their plants shut down, and thus did not boost total unemployment, at a postwar low for the season. The quit rate —24 per 1000 employees in July— was about the same as in June.

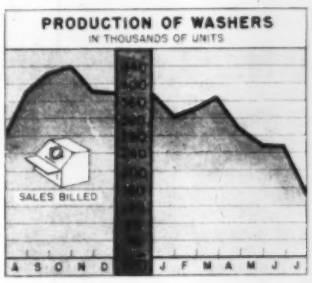
Trends Fore and Aft . . .

Foundry equipment orders index for July dropped 3 points to 390 per cent of the 1937-1939 average . . . Personal income moved to a new high annual rate in July: $251.6 billion, up $600 million since June . . . Private industry's wage and salary payments dropped $700 million in July to annual rate of $140.4 billion . . . Copper supplies for consumer goods will be trimmed to 54 per cent and aluminum to 46 per cent of base in the fourth quarter . . . Appliance industry men are predicting that retail sales will outpace factory production in the fourth quarter.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction	Aug 27	Indus. Production	July 23	Ranges, Gas	Sept 3
Durable Goods	Aug 6	Machine Tools	Sept 10	Refrigerators	Aug 6
Employ., Metalwk.	July 16	Malleable Castings	Sept 10	Steel Castings	Sept 10
Employ., Steel	Aug 27	Prices	Aug 27	Steel Forgings	Aug 20
Fab. Struc. Steel	Sept 10	Pumps, New Orders	July 9	Steel Shipments	Aug 27
Foundry Equip.	Sept 3	Purchasing Power	Sept 3	Vacuum Cleaners	Sept 3
Freight Cars	Aug 20	Radio, TV	Aug 20	Wages, Metalwkg.	Aug 13
Gray Iron Castings	Sept 10	Ranges, Elec.	Aug 27	Water Heaters	Sept 3





Standard-Size Ironers
Factory Sales—Units

	1951	1950	1949
Jan.	24,600	20,300	28,300
Feb.	32,400	27,600	28,400
Mar.	34,700	37,800	23,800
Apr.	23,700	31,600	18,100
May	24,200	27,400	19,500
June	24,500	27,100	21,100
July	11,100	25,100	17,700
Aug.		42,700	32,300
Sept.		41,400	27,700
Oct.		47,500	36,045
Nov.		41,900	35,000
Dec.		38,800	19,400
Total	409,200		307,345

American Home Laundry Mfrs. Assoc.

Household Washers
Sales Billed—Units

	1951	1950	1949
Jan.	321,092	275,576	172,400
Feb.	341,328	342,967	201,300
Mar.	368,455	423,802	242,500
Apr.	292,193	333,072	192,500
May	253,942	304,640	211,700
June	253,119	325,217	260,700
July	139,779	282,261	200,900
Aug.		381,452	323,789
Sept.		424,043	357,281
Oct.		439,924	333,728
Nov.		379,964	298,717
Dec.		377,013	237,591
Totals	4,289,931		3,033,106

American Home Laundry Mfrs. Assoc.

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REAMERS offer a Broader Range of STANDARD Sizes

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FRACTIONAL sizes 1/16" thru 1-1/2" are STANDARD

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L&I's broader range of standard sized reamers of all types reduces the need for costly specials. In addition, you get matchless quality and performance. See your L&I Distributor today

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The Reamer Specialists

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CHICOPEE, MASS.

FOUR BONUS FEATURES OFFERED BY *Improved* SUNOCO EMULSIFYING CUTTING OIL

1. **Better metal-wetting characteristics and detergent properties. *Improved* Sunoco Emulsifying Cutting Oil means cleaner machines and longer wheel life on grinders.**

2. **Better rustproofing action. *Improved* S.E.C.O. gives even more protection.**

3. **Faster mixing in water. *Improved* S.E.C.O. requires less stirring, shorter emulsion preparation time.**

4. **Better operator acceptance. *Improved* S.E.C.O. forms a pleasing, cream-colored emulsion.**

IN ADDITION YOU GET THESE SIX ESTABLISHED FEATURES

1. Superior lubricating and heat-absorbing characteristics—making S.E.C.O. particularly suitable for accurate, high-speed production.

2. Increased tool life—another S.E.C.O. contribution to profitable operations.

3. Utmost in economy—low initial cost, plus increased production.

4. Will not turn rancid or permit the growth of bacteria which cause skin inflammation—remains hygienic and pleasant smelling.

5. Forms stable emulsions.

6. Does not deteriorate in storage.

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SUNOCO®

Men of Industry

B. R. TEREE
. . . rejoins Weatherhead Co.

W. CORDES SNYDER Jr.
. . . new president of Blaw-Knox

M. E. PETERSON
heads Clearing Machine's plant

B. R. Teree has rejoined **Weatherhead Co.,** Cleveland, as chief engineer, aviation division. His former association with the company began in 1946 as project engineer. He later became director of laboratories and engineering manager. Most recently Mr. Teree was director of engineering for the hydraulic division of New York Air Brake Co. at Watertown, N. Y.

Charles C. Buckland was elected a vice president of **Minneapolis-Honeywell Regulator Co.,** Minneapolis, to head a newly created subcontracting division which will correlate and expand subcontracting activities of the aeronautical and ordnance defense programs. Mr. Buckland is also a director and secretary of the company. **Glenn Seidel,** assistant to the vice president in charge of engineering, was appointed to the newly created post of director of ordnance, and **Stanley J. Nelson** to another new post of superintendent of ordnance.

Jack Kyle was appointed sales manager, steel products division, **West Virginia Steel & Mfg. Co.,** Huntington, W. Va. He goes to Huntington from Pittsburgh where he was with American Steel & Wire Co. **Charles Scrivner** was appointed assistant sales manager, concrete reinforcing bar division, at Huntington. He was acting head of the Department of Engineering, Marshall College.

Harrison Webb was appointed superintendent of the new strip mill to be constructed at the Allenport Works of **Pittsburgh Steel Co.,** Pittsburgh. Before joining Pittsburgh Steel, Mr. Webb was at the Warren, O., plant of Republic Steel Corp. for 14 years.

W. Cordes Snyder Jr. was elected president and chief executive officer of **Blaw-Knox Co.,** Pittsburgh. He was a vice president in charge of the Lewis Foundry & Machine Division, and more recently served as vice president and manager of the Blaw-Knox metallurgical department. He takes his position about Nov. 1. **William P. Witherow,** former president and chairman, continues as chairman of the board. **Chester H. Lehman** continues in his present capacities as vice chairman of the board and executive vice president.

James W. Murray resigned as vice president of Albot Steel Co., Lyndhurst, N. J., to become associated with **Fabricators Steel & Mfg. Corp.,** New York, in an executive capacity.

A. D. Engle, a member of **Austin Co.'s** engineering staff since 1920 and its district engineer at Chicago since 1945, was appointed assistant vice president for research. He will be responsible for special engineering research work and certain foreign assignments, with headquarters at the company's general offices in Cleveland. **George Miller,** Austin's co-ordinating engineer on Atomic Energy Commission work at Oak Ridge since 1948, succeeds Mr. Engle as Chicago district engineer.

Charles R. Parsons will soon return from England to assume the newly created position of production manager at the **Ingersoll Rand Co.** plant in Painted Post, N. Y. For the last four years he was general superintendent of the firm's plant in Manchester, England. He is succeeded there by **John E. Halbing.**

M. E. Peterson was named general manager of **Clearing Machine Corp.'s** recently acquired plant at Hamilton, O., purchased complete with machinery and equipment from Hamilton-Thomas Corp. It will be utilized immediately in expanding production of the Chicago company to meet defense requirements. With purchase of the Hamilton property, Clearing abandoned plans to erect a factory building on recently acquired land in Joliet, Ill., activity of which was to have been headed by Mr. Peterson. He has been with Clearing in various executive capacities since the company was formed in 1933.

Appointments in the rolling division, **Fairless Works,** Morrisville, Pa., U. S. Steel Co., include **J. E. Foldessy,** superintendent-maintenance; **T. D. Clifford,** superintendent-hot strip and slab mill; **W. E. Banner,** assistant superintendent-hot strip and slab mill; and **R. E. Madden,** assistant superintendent-maintenance.

John P. Stitt was named district sales manager in Cleveland for **Brainard Steel Co.** He was the company's representative in the Buffalo district and is succeeded there by **James O. Tavenner,** formerly in Brainard's main office in Warren, O.

Cleveland Pneumatic Tool Co., Cleveland, announces that **Maj. Gen. Frederick M. Hopkins Jr.,** recently retired from the U. S. Air Force, has joined the firm as vice president and assistant to the president.

Joseph W. Chanda was named New York representative, **A. O. Smith Corp.'s** International Division. He suc-

ceeds **A. E. Cripps,** who is leaving the company to organize his own export business.

A. V. Smith Engineering Co. Inc., corrosion consultant, appointed **Hugh L. Hamilton** to manage and direct

HUGH L. HAMILTON
. . . manages A. V. Smith Engineering

its activities from its present offices at 370 Trevor Lane, Bala-Cynwyd, Pa. Mr. Hamilton was with subsidiaries of Atlantic Refining Co.—Keystone Pipe Line Co. and Buffalo Pipe Line Corp.—for the last 15 years.

Alex L. Gresham was appointed division metallurgist for standard practices in the metallurgical department of **American Steel & Wire Co.,** Cleveland, U. S. Steel Corp. subsidiary. **Joseph Gray** was appointed division metallurgist for wire at the Joliet, Ill., Works.

George D. Sills was appointed organization manager, **Cadillac Motor Car Division,** General Motors Corp., Detroit. He succeeds **Norman Edwards. Larry M. Brennan** succeeds Mr. Sills as district sales manager, Detroit area.

Charles T. Nevins was appointed to the sales staff of **Heppenstall Co.,** Pittsburgh. He will specialize in sale of several types of equipment developed recently by Heppenstall, including its high speed trepanning lathe and twingage. Mr. Nevins was eastern division sales manager, A. B. Chance Co.

Norman T. Harrison joined **Jones & Lamson Machine Corp.,** Springfield, Vt., as controller.

Albert W. Schaefer was elected president, **Endicott Forging & Mfg. Co. Inc.,** Endicott, N. Y., succeeding the late **Arthur J. Thompson.** Mr. Schaefer has been secretary for 12 years and sales manager for about 20 years.

Copco Steel & Engineering Co., Detroit, elected **Boyd Carnick** vice president. He is succeeded as treasurer by **Frank J. Coykendall,** formerly assistant treasurer. Mr. Carnick has been associated with the company since its inception.

Hyatt Bearings Division, Harrison, N. J., General Motors Corp., appointed **Frank H. Webster** as assistant manager-western division, Chicago. Mr. Webster transferred to Chicago in 1938 from the Oakland, Calif., office, and has been serving as sales engineer.

Dr. Wendell C. Peacock was elected vice president and technical director and a member of the board of directors of **Tracerlab, Inc.,** Boston.

B. M. Laney has joined **Kaiser-Frazer**

B. M. LANEY
. . . K-F aircraft consultant

Corp. at Willow Run, Mich., where during World War II he was general superintendent of final assembly of B-24 bombers. As aircraft consultant he is on the staff of H. R. Smith, works manager in charge of Fairchild C-119 Packet planes for the U. S. Air Force. He is also active in the Chase C-123 program which ultimately will succeed Packet production at the K-F plant.

Thomas Schrader Jr., sales manager, **Erie City Iron Works,** Erie, Pa., was elected a vice president of the firm. He replaces **Dudley Selden,** who resigned the vice presidency but continues as a member of the board of directors. Mr. Schrader continues in charge of sales.

Lucas-Milhaupt Engineering Co., Cudahy, Wis., opened a Chicago division to provide consulting service on a national scale for application of notched-coil silver brazing and soldering rings and coined washers for armament production. The office is located at 333 N. Michigan Ave. and will be directed by **Harlan Olson** who has been at Lucas-Milhaupt as chief consulting and application engineer since April, 1951.

Ransford V. Mann Jr. was appointed Los Angeles district sales representative for Alloy Tube Division, **Carpenter Steel Co.**

A. B. Fisher Jr., chief engineer, engineering and construction division, Koppers Co. Inc., Pittsburgh, was named operating manager of Koppers' **Freyn Engineering Department** offices in Chicago. He succeeds **Gordon Fox,** vice president and operating manager of the Freyn department, who is retiring from that position Jan. 2, but will continue in a consulting capacity with Koppers. **R. J. Sprott** succeeds Mr. Fisher as chief engineer, and in turn is succeeded by **C. S. Carden** as assistant chief engineer. **A. D. Orefice** succeeds Mr. Carden as manager of the division's by-product section.

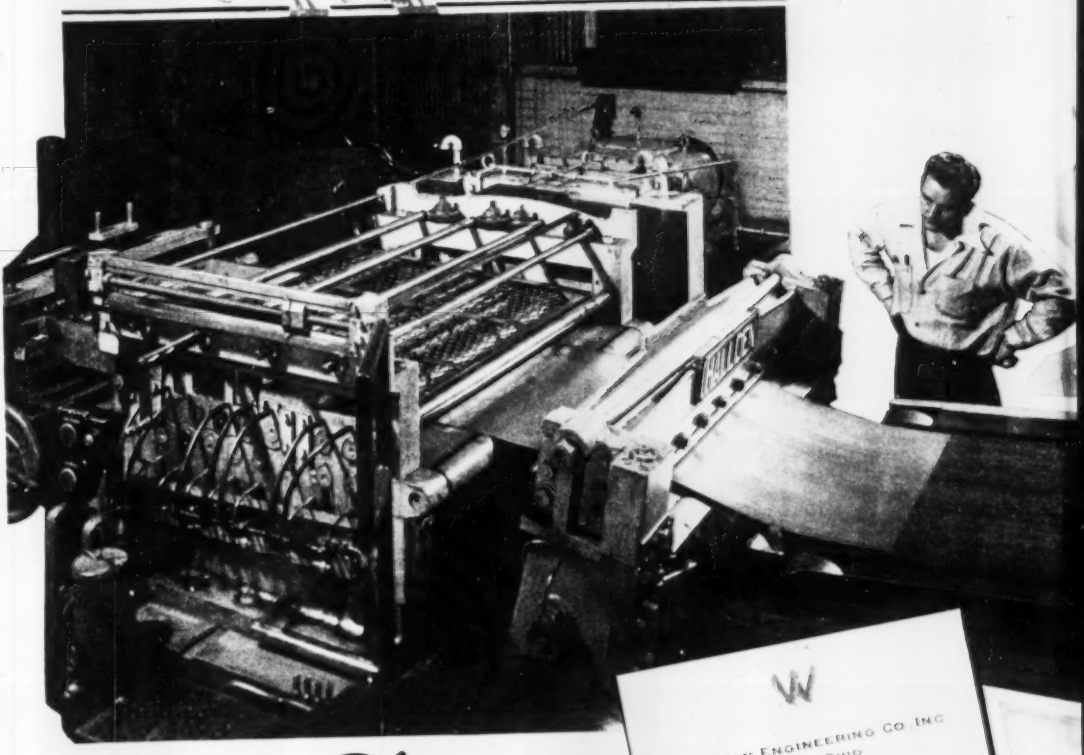
Herbert G. Weightman has been assigned to head the **Progressive Welder Sales Co. of California,** Burbank, Calif., for Progressive Welder Sales Co., Detroit. New offices at Burbank are in the Brown Professional building.

Harry L. Brindle was appointed assistant to vice president-manufacturing, **United States Steel Co.,** Pitts-

HARRY L. BRINDLE
. . . U. S. Steel asst. to V. P.-mfg.

burgh. He was general superintendent of Edgar Thomson Works, Braddock, Pa., and is succeeded by **James W. Kinnear Jr.** who left the company in 1947 to become president of Firth Sterling Steel & Carbide Corp., but returned to the staff of the vice

WEAN



THE WEAN ENGINEERING CO. INC
WARREN, OHIO

Sheet Shearing

WEAN EQUIPMENT FOR CONVERSION OF STRIP IN COIL FORM TO FLAT STEEL SHEETS IN ACCURATE LENGTHS

SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT

JOSEPH F. JANECKE
. . . manages new div. at Ferro

FRANK W. CURTIS
. . . Crescent Metal V. P.-chief engineer

DR. JAMES F. EVERSOLE
. . . research mgr., Union Carbide

president-manufacturing last February.

Joseph F. Janecke was appointed manager of **Ferro Corp.'s** new-products division, Cleveland. He was service manager.

Henry A. Sturm was appointed assistant manager of the Boston branch of **Crucible Steel Co. of America.** He has been assistant to the eastern sales manager.

Leon R. Steffen was named director of purchases for **AC Spark Plug Division,** General Motors Corp., Detroit. He succeeds **Herbert R. Wells,** retiring after 40 years of AC service.

Carl C. Kleinschmidt was appointed assistant general manager of **Williams & Co. Inc.,** Pittsburgh. He is succeeded by **M. C. Young** as manager of the aluminum, brass and copper department. **E. A. Miller** succeeds Mr. Young as manager, accessory department.

Frank W. Curtis was appointed vice president and chief engineer, **Crescent Metal Products Inc.,** Cleveland. He joins Crescent after serving Aluminum Co. of America as metallurgist and sales engineer.

M. B. Atkinson was named manager of the Detroit office, **Wagner Electric Corp.,** to succeed **R. L. Wells,** retired. **A. W. Maas** was appointed manager of the San Francisco electrical office succeeding **E. D. Pike,** retired.

John D. Paulus was appointed director of public relations of **Jones & Laughlin Steel Corp.,** Pittsburgh, to succeed **Earl F. Blank,** who becomes special assistant to the vice president-employee and public relations.

Lamson Corp., Syracuse, N. Y., appointed **Orrin R. Broberg** to the post of mechanical development engineer. He was transferred from Lamson's operations to his present position in Syracuse.

Dr. James F. Eversole was appointed manager of research administration, **Union Carbide & Carbon Corp.,** New York. He joined the corporation's chemical research organization in 1929, and since 1944 has been superintendent of the Linde Air Products Division laboratories at Tonawanda, N. Y.

Gilbert I. Clark was appointed project engineer, **American Cladmetals Co.,** Carnegie, Pa. He formerly was with the aircraft gas turbine division, General Electric Co.

Thomas P. Wallace was named superintendent of **American Brake Shoe Co.** plant in Buffalo. He succeeds **Edward J. Roesch** who was promoted to superintendent of the division's Meadowlands plant near Pittsburgh.

John D. Campbell was appointed general manager of appliance-electronics division of **Canadian Westinghouse Co. Ltd.** He was manager of the electronics division.

OBITUARIES . . .

Alexander L. Luria, 70, president, Luria Bros. & Co., Philadelphia, died Sept. 8 following a heart attack. Growth of the firm which he, his father and two brothers founded in 1889 in Reading, Pa., closely paralleled that of the steel industry. It is now the largest scrap supplier in the world with offices in 17 cities from coast to coast. Mr. Luria's firm pioneered in improvement of scrap handling practices. It also gained wide recognition from the large and unusual scrap salvage jobs it undertook.

Joseph F. Buhr, 74, board chairman, **Buhr Machine Tool Co.,** Ann Arbor, Mich., died recently in St. Petersburg, Fla. He founded the company in 1925. Mr. Buhr also was president of Huron Gray Iron Foundry Co. and American Pattern & Foundry Co., Ypsilanti, Mich., and R. & B. Tool Co., Saline, Mich.

George Kirlin, 57, vice president, **Canada Wire & Cable Co.,** died Sept. 2 at his home in a suburb of Montreal.

Michael Langermeier, 66, superintendent of **Pioneer Mold Co.,** Cleveland, for 17 years until retirement in 1946, died Sept. 9.

Edward P. Holder, 59, president and director of many metal firms, died Sept. 5 in Springfield, Ill. He headed **Vulcan Iron Works,** Wilkes-Barre, Pa.; **Colorado Fuel & Iron Corp.; Union Plate & Wire Co.; Standard Silica Corp.; American Wire Fabrics Corp.** and **Wickwire Spencer Steel Co.**

Fred M. Carter, 82, who retired 14 years ago as president of **National Lead Co.,** New York, died Sept. 7 in Los Gatos, Calif.

Wallace Hoffman, 62, a superintendent for the Gary, Ind., works of United States Steel Corp., died Sept. 9.

L. B. McGrew, assistant general manager and a director, **Williams & Co. Inc.,** Pittsburgh, died Aug. 31.

George Matthews, 44, chief engineer, **Midland Steel Products Co.,** Detroit, died Sept. 2.

Fred M. Kern, 67, tool engineer, **Detroit Gear Co.,** Detroit, died Aug. 28.

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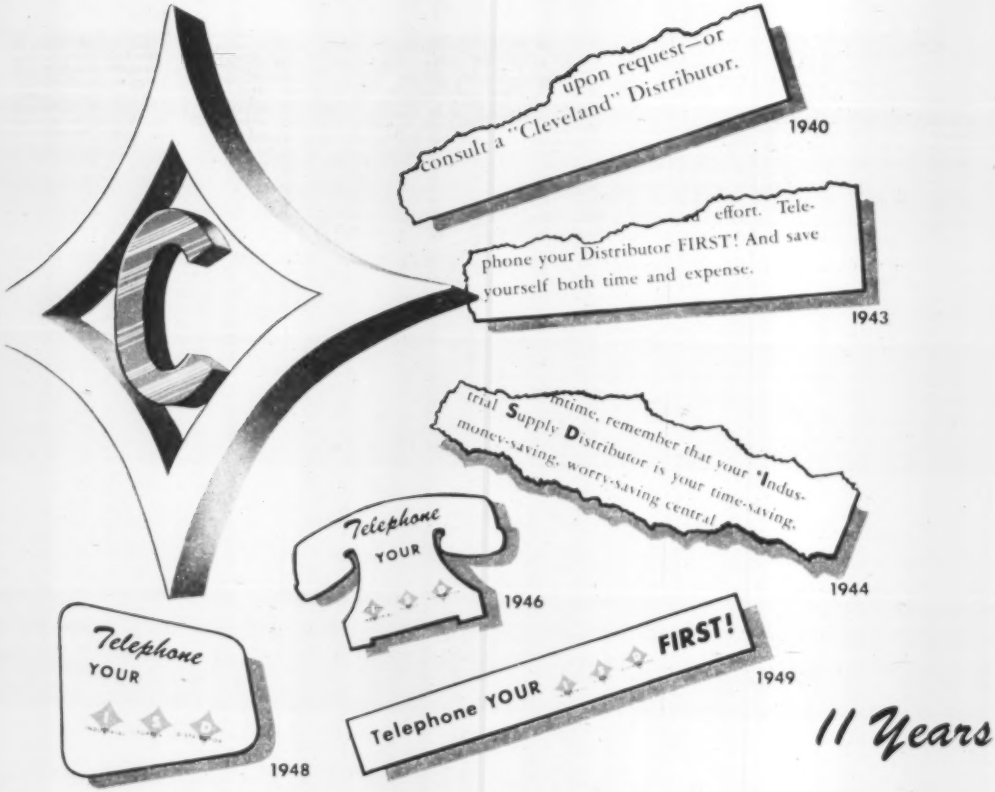

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For more than ten years we have been reminding you to "Telephone Your Industrial Supply Distributor" for prompt, dependable service on *Cleveland* Twist Drills, Reamers and other tools bearing the famous ◇ trade mark. The arrangement of the words has been changed from time to time, as illustrated above—but the message always has been the same.

Since 1940 we have been making this suggestion month after month in all of our advertising—and it's just as timely today. Whatever tools, equipment or supplies you may require, you will save time and money by calling your Industrial Supply Distributor *first*. Even in the case of hard-to-get items, you'll find that often he is able to speed deliveries. For your Distributor is a favored customer of many factories; he has "first call" on their production.

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Production and Engineering
NEWS AT A GLANCE

CONTINUOUS TITANIUM CASTING—Two special furnaces for melting titanium sponge and converting it to ingot have been designed by Du Pont engineers and are now in operation. Both are of commercial proportions and in one more than 15 tons of metal has been melted thus far, with ingots up to 650 pounds now being cast. Six of these units are under construction or in operation in the metals industry. The other furnace, based on arc heating, may hold the key to continuous melting and casting of titanium. With it, round ingots can be formed continuously from molten metal, then cut to suitable lengths.

STEAM TREAT FOR STRENGTH—Shock absorber pistons of compacted and sintered powdered iron showed deficiencies in compressive strength and resistance to wear, despite their savings in machining over the original cast iron design. Steam treatment in a Homo furnace corrected the weakness, raising surface hardness to as high as 85 Rockwell B, doubling compressive strength and providing a denser structure as a result of the blue oxide coating on the iron particles filling voids. Further, the oxide helps to hold lubricant, thus giving better resistance to abrasion.

TIN-NICKEL PLATE PROMISING—Bright coatings of a 65-35 tin-nickel alloy may be electrodeposited on steel (with copper undercoating) or brass from a solution containing stannous chloride, nickel chloride and sodium and ammonium fluorides, according to British research reports. At a temperature of 65° C and average cathode current density of 25 amperes per sq ft bright plate is obtained over irregular objects at current efficiency approaching 100 per cent. The deposit is hard and lustrous, in some illumination exhibiting a faint pinkish cast. Coating thickness of 0.0005 to 0.001-inch is recommended, depending upon service conditions. The process is just moving into the pilot plant stage in Britain.

SAVE THE SULPHUR—Few subjects give such a high clocking on the Geiger counter of reader interest these days as the conservation or reclamation of sulphuric acid in pickling operations, the result, of course, of demand outdistancing supply in respect to the element sulphur. Just about the time a workable method for doing the job has been proved and accepted, raw sulphur will be running out our ears; meanwhile ideas are at a premium.

EXTENDING RANGE OF POWDERS—Obtaining uniform density throughout powdered metal compacts is one of the principal problems facing operators in the field. One company has installed new presses with upper and lower cylinders which may be adjusted to provide a definite ratio between top and bottom pressure so that a wide variety of shapes may be produced with close control of density. The press design is being modified in 200 and 300-ton units now abuilding, in which the table section literally will float during the pressure cycle. It is expected these presses will be able to turn out compacts with thin shoulders or flanges, outside the capabilities of present equipment. —p. 84

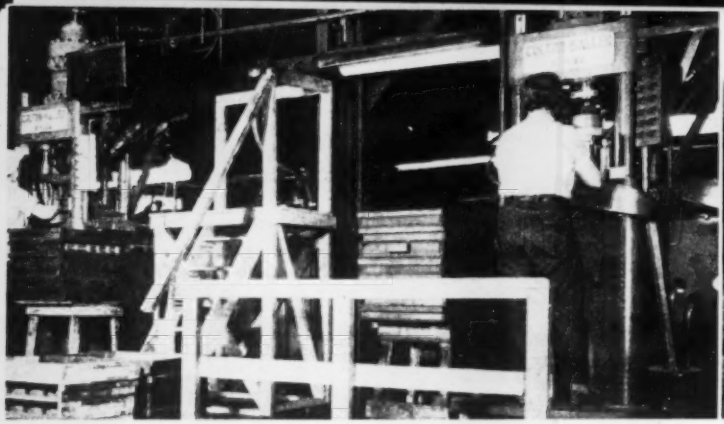
MASTER-SLAVE MOTORS—Accurate control of cutting tools on the two saddles of a 30-foot boring mill, so that one tool does not hog the cut at the expense of the other, is handled nicely by an arrangement of direct-current "synchros" with master and slave motors electrically interconnected so that their rpm never differ by more than four. This servo system keeps the 20-horsepower feed-traverse motors synchronized within a few rpm of each other, even when accelerating from standstill to maximum speed and likewise during deceleration, by dynamic braking of the master motor. It's another example of push-button precision control commanding the operation of a 500-ton machine tool. —p. 88

STITCHER INVERTED FOR SPEED—Replacing the conventional steel frame with a Masonite panel in an automotive seat cushion required some quick and accurate means of attaching the coil springs to the panels. Steel wire stitching was the answer. Special stitching equipment was developed to permit operators to spot the springs properly and see that they were being correctly clinched. The entire stitcher was inverted and the head placed beneath the fiber panel with the springs located on top of it, a clincher arm extending over the bottom wire of the spring. Each of the 48 coils used requires two staples and the entire unit can be turned out in 3-5 minutes. —p. 86

AIRCRAFT STEELS GOING BORON?—An Alternate Steel Panel has been designated by the aircraft industry to handle the engineering aspects of substitutes and alternates, and has initiated a survey of the industry to outline the areas of testing and test materials required. For the present only boron-treated steels are under consideration by the seven members of the panel.

FLOATING DOCKS PAY OFF—Adjustable ramps on loading and shipping docks are paying their way in many plants where the bulk of incoming materials and outgoing shipments is via truck. Actuated by hydraulic cylinders, the ramps are made in at least three designs. One is hinged to the dock at the inner end, the outer end being raised flush with the truck platform. A second comprises a platform which lifts to the truck level, then lowers to the plant floor level, this for use where no loading dock is available. A third is built into the truck well and raises the rear wheels of the truck to bring its floor level with the dock. —*A.H.A.*

Metalworking Outlook—p. 47 *Market Outlook—p. 151*



Two briquetting presses with upper and lower cylinders, permitting definite ratio between top and bottom pressure for compacts of uniform density

Charging side of controlled atmosphere furnaces for sintering or infiltrating compacts in production quantities

Density of Powder Metal Parts

Controlled Accurately

Hydraulic powder compacting presses having a fine degree of adjustment in travel of upper and lower rams permit attainment of the desired final density uniformly throughout the section. Novel types of powdered metal bearings have cavities to hold lubricant supply. Pockets as well as pores in the body are filled under static pressure

By A. H. ALLEN
Associate Editor

ADVANCES in the field of powder metallurgy have been numerous and widespread in recent years. Technical developments in equipment, processing and metallurgy have made applications of this method of produring metal parts almost unlimited. Cams, levers, gears, bearings, ratchets, etc. are only a few of the many better known parts made of metal powder to save the cost of machining operations required to make them by conventional methods.

One of the most recent developments in this field, it is claimed, provides a means of accurately controlling density in pressing powder metal parts of varying cross-section. Working with engineers of the Arthur Colton Co., Detroit, John Haller, vice president and general manager of Michigan Powdered Metal Products Co. Inc., Northville, Mich., has designed a hydraulic press which has upper and lower cylinders which permit establishment of a definite ratio between top and bottom pressure for compacting metal powder briquets with uniform density. This ratio is dependent upon the relationship between vertical and horizontal dimensions of the die cavity in which the part is made, and, of course, these dimensions are determined by the compact's final shape and size. A fine degree of adjustment available in the travel of the upper and lower rams permits attainment of the desired final density uniformly throughout the part sections.

Shown in the accompanying chart is the inter-relation of length, density, relative density and compacting pressures in working with a typical iron-base powder mix of an apparent loose density of 2.80 grams per cu cm. Mix particle sizes may range from 80 to 325 mesh.

The press is made in capacities of 100 and 125 tons, the 125-ton unit being powered by three 10-hp motors, maximum hydraulic pump pressure being 600 psi. This is built up through intensifiers in a ratio of 5 to 1 giving the press a 3000 psi maximum hydraulic system for the final pressing. The lower cylinder is a dual concentric arrangement in which an outer cylinder supplies the bottom compacting pressure and an inner cylinder provides the ejection pressure. Travel of the upper ram is 6-inch maximum, $4\frac{1}{2}$-inch minimum; all cylinders are individually adjustable in a rather simple manner and locked in a preset position. Sum of the two strokes is always equal to the desired fill. The lower compression stroke can be made inoperative by locking it out of operation if it is desirable to do all compacting from the top side. The ejection cylinder will function in the usual manner. There will be one motion from the top side of the die table. Tolerance of thickness

Furnaces have chain belt hearths and are of different lengths to accommodate varying sintering cycles. Copper infiltration of iron compacts yields high strengths without subsequent coining

can be held to 0.002-inch plus or minus. Cycle time from filling to ejection varies from 12 to 18 pieces per minute. The press is of the four tie-rod type and measures 42 inches square, 12 feet 8 inches in overall height with the die table 7 feet off the floor.

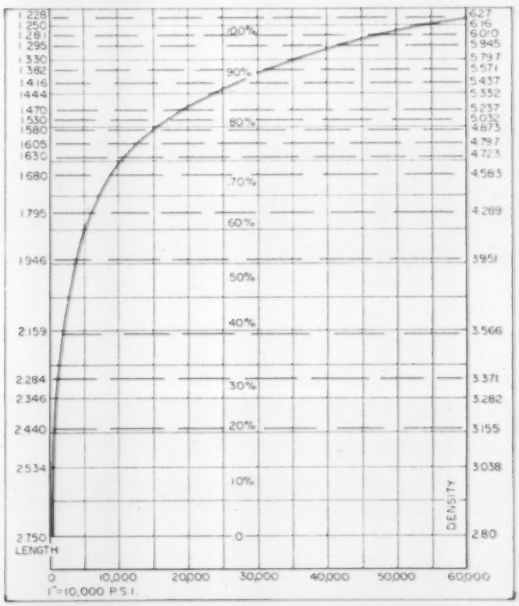
By a slight design modification, an arrangement could be worked out so that the table section would literally float during the pressure cycle, thereby equalizing densities of the part being compacted. This idea is being incorporated in two new presses to be rated at 200 and 300 tons respectively. They will have two top rams in addition to the two concentric lower rams plus hydraulic table supports. They are expected to permit compacting of part designs that cannot now be handled successfully. Details such as thin shoulders or flanges should be readily attainable.

Another of Haller's developments is a line of "oil-well" bearings. They comprise compacted and sintered bearing shapes, containing a cavity to form a lubricant reservoir.

They may be of the pocket type where the lubricant reservoir is fairly large which is particularly suited for heavy load applications; sponge type in which the pocket is filled with sponge iron to provide capillary action to retain oil—particularly suited where heat is involved; or the hole type where rows of small annular holes replace a single pocket to provide additional wall strength.

Oil or grease is impregnated into the bearing's sintered metal walls by static pressure, filling the cavity or pocket as well as the pores in the body, resulting in a greater oil content than with other types of sintered bearings. Bearings are of relatively high density, around 6.6 grams per cu cm, helping to seal in the oil and prevent any dripping. They can be hardened and ground and are especially adapted to pillow blocks, motor bearings with large diameter shafts, and guide pin bushings in presses. In one high-speed press installation, after several million cycles of operation during which no lubricant was added there was no noticeable guide pin wear.

High strengths in powdered metal parts are realized by a technique known as infiltration. Copper and lead are two frequently used infiltrating metals. After the "green" parts have been produced they are loaded on the chain belt of a continuous heating furnace and a small pellet of whatever metal is chosen for infiltration is placed on top of the part. The infiltrating metal is uniformly distributed throughout the part as the melting temperature of the infiltrant is reached. Furnace atmosphere may be either reducing in character or of the inert type. Sintering temperature is around 2100° F. Conventionally sintered parts are coined or restruck and in some cases hot pressed for greater strength and dimensional accuracy. However, using copper infiltration of powdered iron compacts, it is possible to develop strength equivalent to mild steel with no coining following the heating cycle.



Inter-relation of length, density, relative density and compacting pressures for a typical iron-base powder mix

Upside-Down Stitcher Saves Critical Steel

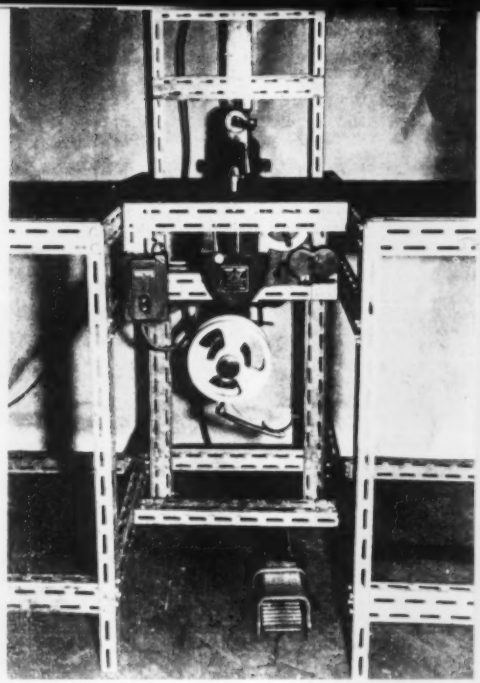
SAVINGS of 25 per cent of the steel formerly used for the manufacture of automotive seat assemblies are being secured by use of an upside-down stitching machine designed through the co-operative engineering efforts of L. A. Young Spring & Wire Corp., Detroit, and the stitching wire division of Acme Steel Co., Chicago. The unit makes possible a fast and economical method for manufacturers, according to Acme's engineers.

This new technique uses an upside-down version of the N2A-20 Acme-Morrison machine to stitch coil springs to Masonite panels. This is in contrast with conventional manufacture of cushion and back seating units in which springs are fastened to stamped-steel seat frames.

Success of the plan to replace steel frames with less-critical material depended upon finding a method for fastening coil springs to the composition panels at production rates. Successful attachment with conventional stitching machine was impossible because springs and stitches had to be positioned "blind."

Two Stitches Per Spring—Because the upside-down stitcher's clinching arm is on top rather than under the work, stitches can be located visually and formed at satisfactory rates. Printed circles on the board speed coil positioning. Each coil is fastened to the panel with two by-pass clinched metal stitches. Legs of these stitches are forced through the board, wrapped around the spring, and returned to touch the board.

A complete inversion of the stitching machine's elements was necessary in order to position the clinching arm over the work. The head, drive and clinching arm assembly was detached from its base and mounted upside-down on a special steel stand by bolts through new mounting holes and by special clamps.



Essential mechanisms of the stitching machine are held in their upside-down positions on a special steel stand. Overall table size is 10 x 2½ feet

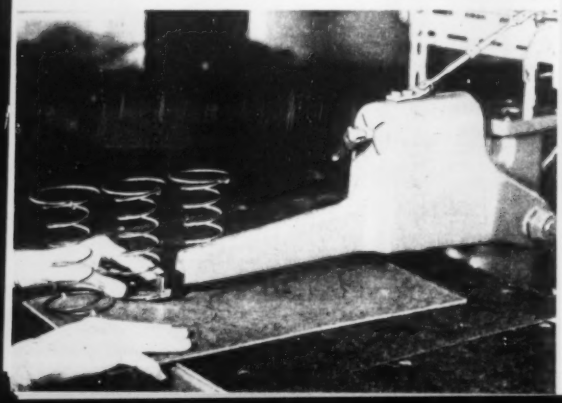
The clinching arm—normally held in position by gravity—is held against the main column by a turnbuckle. Pressure takeup is still provided by the arm adjusting screw. The standard wire spool holder was removed and replaced with a friction-type brake spool. This was positioned directly under the stitcher head to provide easy access for installing full coils of stitching wire.

Cycle Requires 1/5-Second—Stitches are automatically cut to length, formed, driven and clinched in approximately 1/5-second when the operator depresses an electrically controlled foot pedal. The machine will not repeat itself—each depression of the pedal produces only one stitch. Stitching wire is fed to the shearing-forming-driving mechanism from a 25-pound coil holder whose braking mechanism prevents overrunning and wire tangling.

Clinching occurs when the two legs of the stitch, after penetrating materials being joined, enter and follow the curved contour of the clincher die. A by-pass clincher die mounted in the machine's clinching arm guides the legs around the coil spring and back to the board.

If setup and positioning took no time at all, the machine could operate at the rate of 280 stitches per minute. However, depending upon skill of operators, total time for positioning and stitching 48 coils to the seat panel ranges from 3 to 5 minutes. Material cost of the 96 stitches used is only one cent.

Coil springs are fastened to Masonite panels with two by-pass clinched metal stitches on this upside-down version of an N2A-20 Acme-Morrison stitching machine. Inversion of the driving and clinching elements make possible fast visual location of stitches. The clincher die can be seen extending from the clinching arm, the latter being held in its inverted position by a tensile-loaded turnbuckle



Output Doubled by

Improving Drill Press Feed Setup

Seated comfortably between two units, operator is concerned only with keeping magazine chutes filled, changing drills at regular intervals and exercising general supervision. When one unit requires minor servicing, the other goes right on doing the job

By FRANK M. BUTRICK Jr.
Consulting Tool Engineer
Alma, Mich.

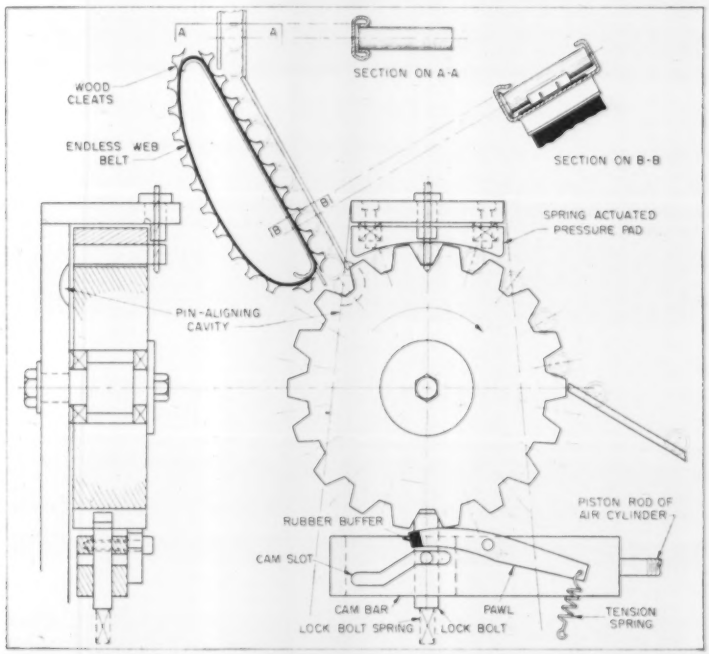
OLD IDEAS ingeniously applied jumped production over 120 per cent on a clevis pin drilling job at the plant of a Detroit manufacturer of automotive subassemblies. Novel adaptations of feed wheel and stock chute enable one operator to run two drill presses, thereby boosting production from 1000 to more than 2200 pieces per hour.

These pins are of 1020 steel, 1¼ inches long and 5/16-inch in diameter and are cold-headed. Holes 1/16-inch in diameter must be drilled ⅛-inch from their small ends. Two Walker-Turner drill presses equipped with Bellows-Senacon air feed mechanisms actuated by microswitches, provide repetitive drilling and retraction cycles. Work handling fixtures are shown in detail in the accompanying diagram.

Most economical runs of these small drills between sharpenings has been found to be 800 to 900 pieces. Removing and replacing them consumes 1.65 minutes, therefore each machine needs between two and three minutes reserve of work in the magazine to insure unbroken production on one unit while a dull drill in the other is being replaced with a sharp one.

Attention Needed—Because of narrow profit margin, coupled with the fact that constant attention is demanded when using these small drills, the idea of a completely automatic installation was rejected. Instead a system comprising an automatically indexed feed wheel coupled with a stock chute holding a three-minute supply of pins was adopted. Both feed wheel and chute incorporate novel ideas designed to make the production cycle practically continuous.

Feed chute is made up of two parts, a vertical section about 12-inches long, and a short auxiliary section which meets the feed wheel at an angle of about 60 degrees to the horizontal. The latter section aligns pins and feeds them to wheel without possibility of their jamming. The vertical section is a length of sheet metal formed into (*Please turn to Page* 110)



Layout of belt-fed indexing fixture for semiautomatic drilling of 1/16-inch holes in clevis pins, this being left hand member of double fixture setup for one-man operation of two drill presses

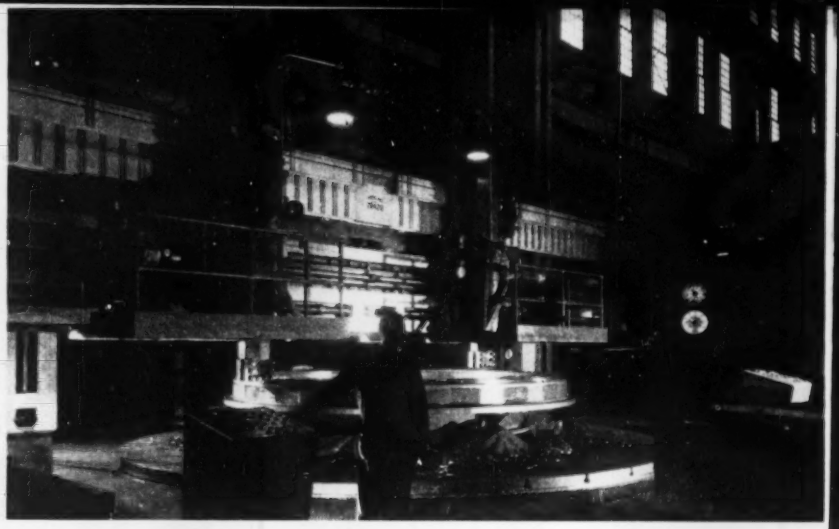


Fig. 1 — Synchro-equipped 30-foot turning and boring mill in action on a disk job. One operator is at one of the four master control stations, while another "rides the tool" on the railed platform attached to the right hand head

DC "Synchros" Control Feeds On Huge Boring Mill

By a direct current system embodying "master" and "slave" motors, the feed works of this 1 million pound machine tool are kept exactly in step throughout their entire operating range.

By ROBERT A. GERG
Control Engineering Section
Allis-Chalmers Mfg. Co.
Milwaukee

USE of synchro indicating and control equipment throughout the steel industry is becoming more and more common. It is found in all phases of the industry. Applications extend all the way from remote control of hoists in mines, to rudder angle indicators on ore boats, to screwdown indicators in the mills. Other applications include side guide indicators, order telegraphs and their many special applications.

Use of synchros in control systems of large machine tools and related equipment likewise is accepted practice. One of the machine tools in which dc synchros are involved is the 30-foot table vertical turning and boring mill shown in action in Fig. 1. This mill was installed recently at West Allis, Wis., works, Allis-Chalmers Mfg. Co. Unique not only in size but also in extent of automatic control, this mill was built by Baldwin-Lima-Hamilton. It weighs 1 million pounds, will handle work 30 feet 6 inches in diameter by 17 feet 3 inches high.

Smooth Operation—Besides being one of the largest machine tools of its type, it also is one of the most completely automatic. Once initiated at any one of four master pushbutton stations, most of its functions "carry themselves on from there."

The two cutting tools are bar-mounted on separate saddles on the cross rail. Each saddle has its individual feed-traverse motor. Both tools operate simultaneously on the same surface of the workpiece. Hence if one of these cutters should feed in faster than the other, it would "hog" the entire cut. The other cutter in the meantime would contribute nothing.

Therefore it is imperative that exact relationship be maintained between feeds of the two cutting tools. Because of the great size of this mill, and because of variety and complexity of its machining operations, it is undesirable to control both cutters from a single motor through any sort of mechanical tie. Therefore each cutting tool is actuated by an individual motor. Each is mounted on its own gear box, these gear boxes being attached to opposite ends of the cross rail. These feed-traverse motors are of direct current type rated 15/20-hp. Their speed range is 30-600 rpm by armature control and 600-18 rpm by field weakening. This 60:1 speed range, combined with automatic gear shifting, results in overall range for each cutter of 1500:1, this being by infinite steps.

Keeping in Step—Dc synchros, together with a mechanical differential, maintain synchronism of these independent dc feed-traverse motors. Fig. 2 in turn depicts the dc synchro transmitter which in the assembly is geared to the feed and traverse motor.

Allis-Chalmers dc synchros, unlike ac synchros, embody a transmitter which is a continuously wound resistance potentiometer arranged for continuous rotation. When connected to a load of proper impedance, its output is a two-phase sinusoidal current and voltage. The transmitter is of commutator type designed for continuous rotation at relatively high speeds.

Faithful Follower—The dc synchro receiver may be compared with a two-phase synchronous motor. It has a special two-phase winding and permanent magnet rotor. When proper electrical connections are made, the receiver follows degree by degree the rotation of its transmitter.

This servo system keeps the two feed-traverse motors synchronized within a few revolutions of each other regardless of the time required to complete any operation. This is true even when accelerating from standstill to maximum speed and likewise during deceleration by dynamic braking of the master motor. In each case the synchronizing and electronic controls keep slave motor in step with master motor.

Pressing a pushbutton simultaneously energizes both feed-traverse motors from their respective electronic controls. Gear ratio between slave motor and its transmitter, indicated by symbol TRS in Fig. 2, master motor and its transmitter, indicated by TRM, are the same. When feed-traverse motors are energized, master transmitter TRM and slave transmitter TRS also are energized. When the motors start to rotate, the two transmitters also rotate. Since proper electrical connections have been established between each transmitter and its respective receiver, master receiver REM and slave receiver RES also turn in synchronism with respective transmitters and motors.

Balancing Act—Rotor of each receiver is directly connected to the input shaft of a mechanical differential. Any difference in total revolutions of master and slave motors results in turning the output gear of the differential. On the other hand, when total number of revolutions of the two motors remains the same in any period of time, output gear remains stationary.

Any rotation of output shaft of differential results in turning one input shaft of the second, and horizontally located, mechanical differential. Since output shaft of this differential is prevented from rotating by stationary reset motor, second input shaft of this differential rotates through the same angle as the first input shaft, but in the opposite direction. This rotation of a second input shaft of differential results in movement of four cams and rotor arms of automatic speed regulating rheostat. Movement of this rheostat arm results in a "change signal" being sent to the automatic electronic control for the slave motor. This signal results in change of speed in slave motor, bringing its total number of revolutions to identical total of master motor. At no time—regardless of conditions imposed on these two motors —will their total number of revolutions differ by more than four.

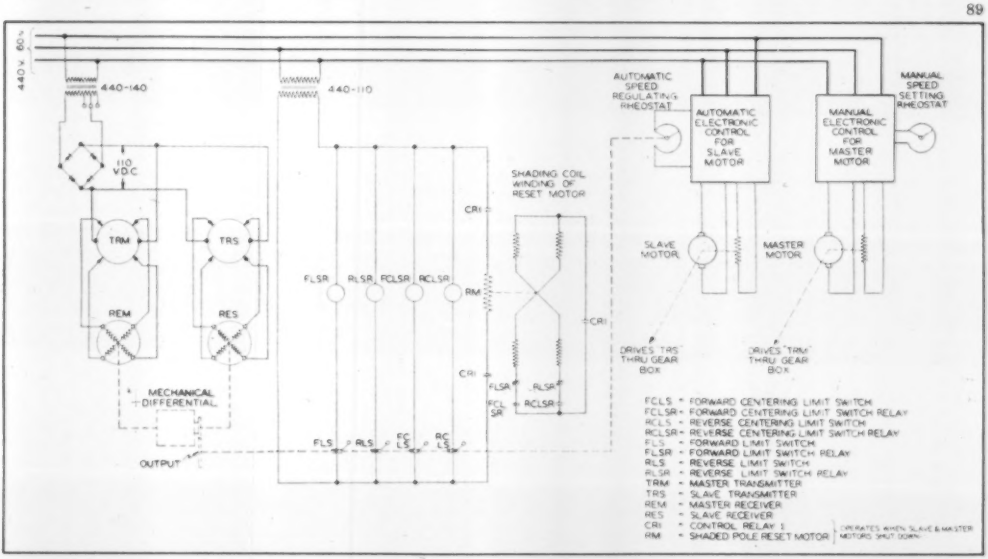
Protection Built-in—As a safety precaution against the remote possibility in that total differential in revolutions between the two motors should become exccessive, either the forward or reverse limit switches FLS or RLS shown in Fig. 2 will operate to energize relay FLSR or RLSR, thus shutting down both motors and stopping feed of cutting tools.

Regardless why the feed-traverse motors might stop, the circuit is such that arm of automatic speed regulating rheostat returns to its center position before these motors are restarted. Any time these motors are stopped, relay CR1 is energized. In closing its contacts connect power to main winding of reset motor as well as complete a circuit in the shading poles of the motor.

Limit switches FCLS and RCLS are cam operated. One switch will be closed whenever rheostat arm of automatic speed regulating rheostat is left of center, the other when the arm is right of center. Assuming that on occasion of shutdown rheostat arm is right of center, limit switch RCLS closes, thus energizing relay RCLSR. That in turn closes shading coil circuit of reset motor. This results in rotation in direction which returns rheostat arm to center of rheostat.

Since both limit switches FCLS and RCLS are open in center position, relay RCLSR also opens, thus stopping rotation of reset motor. This circuit is so interlocked that the two feed and traverse motors cannot be started until this sequence has been completed.

Fig. 2—Circuit diagram of synchro transmitter

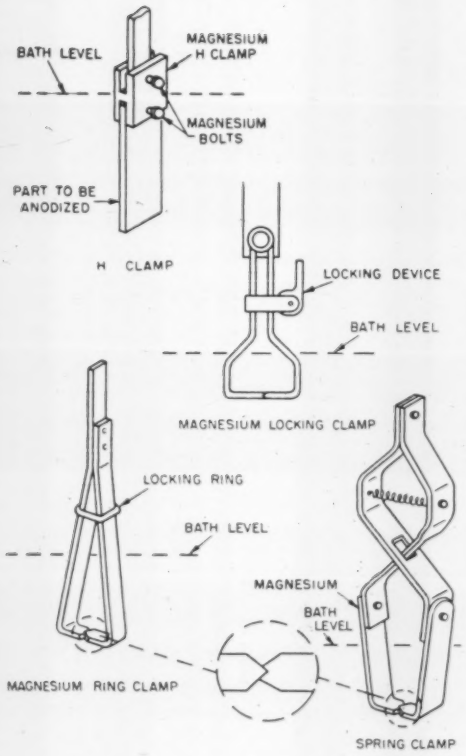


FINISHING

PROTECTIVE chemical treatments and recommended paint systems have been developed to protect magnesium against the corrosive effects of weathering and atmospheres. Chemical treatments are also used to produce special surface effects, such as black nonreflective finishes, bright finish, or to prepare the surface for welding.

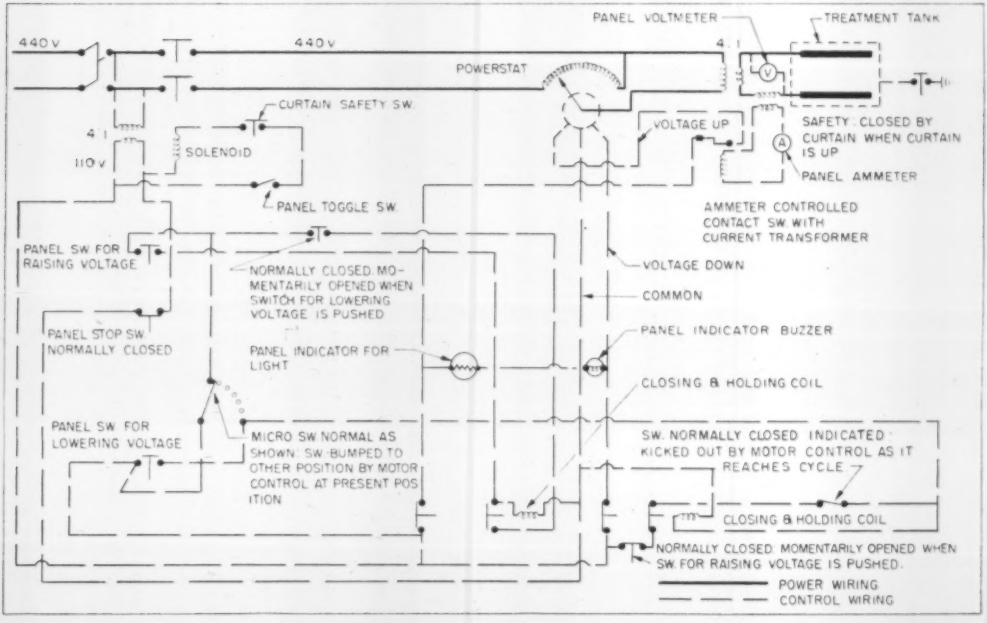
Chromate films form the basis for a number of widely used chemical treatments for magnesium alloys. The films formed are normally amorphous mixtures composed largely of hydrated chromium and magnesium oxides. The procedures for a number of these treatments, listed in the accompanying table, approved by the Army and Navy, are conveyed in detail in specification MIL-M-3171. Relative designations given for the protective value and abrasion resistance ratings are based on tests conducted by Dow Chemical Co.

The protective values were determined by accelerated tests in salt spray, salt water intermittent immersion, and in the atmosphere of interior and exterior exposures.



Left—Clips used for holding parts during anodic treatment for magnesium

Below—Power and control wiring for ac anodic treatment for magnesium utilizing 440 v ac. Illustrations courtesy Dow Chemical Co.


440 v
440 v
POWERSTAT
PANEL VOLTMETER
TREATMENT TANK
4:1
CURTAIN SAFETY SW.
4:1
110 v
SOLENOID
VOLTAGE UP
SAFETY: CLOSED BY CURTAIN WHEN CURTAIN IS UP
PANEL AMMETER
PANEL TOGGLE SW.
AMMETER CONTROLLED CONTACT SW WITH CURRENT TRANSFORMER
PANEL SW FOR RAISING VOLTAGE
NORMALLY CLOSED MOMENTARILY OPENED WHEN SWITCH FOR LOWERING VOLTAGE IS PUSHED
VOLTAGE DOWN
COMMON
PANEL STOP SW. NORMALLY CLOSED
PANEL INDICATOR FOR LIGHT
PANEL INDICATOR BUZZER
CLOSING & HOLDING COIL
PANEL SW FOR LOWERING VOLTAGE
MICRO SW NORMAL AS SHOWN. SW BUMPED TO OTHER POSITION BY MOTOR CONTROL AT PRESENT POSITION
SW. NORMALLY CLOSED INDICATED KICKED OUT BY MOTOR CONTROL AS IT REACHES CYCLE
CLOSING & HOLDING COIL
NORMALLY CLOSED MOMENTARILY OPENED WHEN SW FOR RAISING VOLTAGE IS PUSHED.
POWER WIRING
CONTROL WIRING

MAGNESIUM ALLOYS

With almost all available magnesium going into military application, emphasis is on finishing systems which will render the ultimate in corrosion protection. Methods are available for protecting magnesium by chemical treatment. They improve corrosion and wear resistance, adhesion of subsequent paint coatings and surface appearance

The abrasion tests represent values obtained in a standard method of abrasion testing in which 200 mesh aloxide was impinged by air pressure on a standard size area of the coating. The values shown represent grains of abrasive required to penetrate the coating at 12 oz/sq in. air pressure.

Now when almost all the magnesium available is going into military applications, the emphasis is placed on finishing systems rendering the ultimate in corrosion protection. This discussion concentrates on these systems rather than on the decorative and special coatings used in the commercial market.

Clean Surfaces—Magnesium parts must have surfaces free from oil and grease prior to the application of chemical treatment processes. Where work is contaminated with oil and grease, such contaminants should first be removed by solvent or vapor degreasing to prevent a build-up of oil and grease in the alkaline cleaner. Since magnesium, as contrasted to aluminum, is not appreciably attacked by caustic solutions, alkaline cleaners high in caustic, similar to the type used in cleaning steel should be employed. Alkaline cleaning solutions having a pH value above 11 give best results with magnesium.

Many proprietary alkaline cleaners are available. A satisfactory cleaning bath suggested by Dow Chemical Co. for use as a soak or as an electrolytic cleaner can be made up according to the following formula:

Trisodium phosphate	4 oz/gal
Sodium carbonate	4 oz/gal
Soap (or suitable wetting agent)	0.10 oz/gal

The solution is operated at 180-212°F. Some form of agitation is desirable if the bath is operated below the boiling point. An immersion time of 5 to 15 minutes is usually satisfactory.

Chrome-Pickle — The chrome-pickle treatment is primarily a producer's treatment, but it is also the most widely used as a paint base in commercial applications. The process requires a minimum number of steps and is readily adapted for small shop practice. This treatment, comprising type I of military specification MIL-M-3171, is carried out by dipping magnesium parts for ½ to 2 minutes in a bath composed of 180 g/L sodium dichromate and 187 ml/L of concentrated nitric acid kept at room temperature. Parts are held 5 seconds in the air after removing from the bath prior to rinsing and drying. The sealed chrome-pickle (type II of military specification MIL-M-3171) is carried out by sealing chrome-pickled parts by treatment in a boiling bath containing 100 to 150 g/L of sodium dichromate for 30 minutes.

Dow No. 15 bright pickle for magnesium is a more recent development which with slight variations can be used for the following operations: (a) Bright finish or wrought or cast magnesium parts; (b) cleaner for removal of graphite forming lubricants; (c) cleaning prior to spot, gas and arc welding. A so-called dilute solution is used on all wrought magnesium products, while a concentrated solution produces an equivalent bright finish on magnesium castings.

Extends Solution Life—For treating wrought products, acid pickling prior to the bright pickle is recommended. Cleaned parts should be immersed for 30-60 seconds in 7 to 10 per cent by volume of concentrated nitric acid. Parts are then thoroughly rinsed in cold running water. Use of this acid pickle greatly increases the life of the bright pickle solution and reduces processing time. The parts are then dipped in the bright pickle solution which has the following composition:

Chromic acid	24 oz/gal
Sodium nitrate	4 oz/gal
Calcium or magnesium fluoride	⅛ oz/gal

Bath is maintained at room temperature (70-90°F). Parts which have been acid pickled are immersed in the bright pickle solution for 15 seconds to 1 minute, while those not acid pickled require a 2 to 5 minute treatment period.

Tanks should be equipped with air agitation for cooling and stirring the solution. Where air is not available, the work is agitated or the solution stirred mechanically. After immersion, parts are rinsed immediately in cold running water, then in hot water. If staining occurs, parts are dipped for 30-60 seconds in a cold water bath containing 6½ oz/gal of sodium metasilicate, rinsed in cold running water, then in hot water. When completely dry a clear lacquer or wax may be applied.

Castings Processed—The No. 15 bright pickle for castings is applied to sand, permanent mold and die cast magnesium products. Parts are dipped for 30 seconds to 2 minutes at room temperature (70-90°F) in a bath of the following composition:

Chromic acid	37½ oz/gal
Conc. nitric acid	3¾ fl. oz/gal
Hydrofluoric acid	1 fl. oz/gal

The amount of metal removed from the part by the various steps in the Dow No. 15 treatment should be carefully considered if dimensional tolerances are important. The nitric acid pickle dip removes between 0.0005-0.001-inch per surface, so it should be used in conjunction with the bright pickle where this metal loss can be tolerated. The amount of metal removed by the bright pickle solution varies from 0.0001-

0.0005-inch per surface, depending on length of time in the bath and whether the "dilute" or the "concentrated" pickle is used.

Dichromate Treatment—This chemical treatment for magnesium is type III of military specification MIL-M-3171. The treatment is one of the most widely used on military applications. It combines uniformity in coating, good paint base qualities, negligible metal loss and excellent protective qualities. It is carried out as follows:

Step 1—Parts are dipped from 1 to 5 minutes in a 15 to 20 per cent water solution (by weight) of hydrofluoric acid, at room temperature. Sheet alloys such as FS1 should be treated for only 30 seconds to 1 minute, whereas the high aluminum containing casting alloys may be treated the full 5 minutes. For wrought products it is usually advantageous to use the acid fluorides instead of the hydrofluoric acid. Parts are treated for 15 minutes in a 5 per cent solution of sodium, potassium, or ammonium acid fluoride at room temperature. The acid fluoride will not attack aluminum inserts, etc., and is usually more economical to use than hydrofluoric acid. Parts should be rinsed in cold running water after this step.
Step 2—Following above, parts are boiled for 45 minutes in a 10 to 15 per cent aqueous solution of sodium dichromate, or alternately for 30 minutes in this solution saturated with magnesium fluoride or calcium fluoride. Parts are then rinsed and dried.

Black Finish—A process known as chemical treatment No. 8 has been developed by Dow. The process is somewhat superior to the dichromate treatment in hardness of the coating formed but is about comparable in protective value.

Black finish is obtained by a series of three treating steps. The first removes oxide and brightens the surface of the metal. It utilizes the concentrated bright pickle solution described previously for castings.

After the bright pickle step, parts are given the HF pickle treatment by immersing for 5 minutes in a solution containing 15 to 20 per cent by weight of hydrofluoric acid at room temperature. A satisfactory bath can be prepared by diluting one volume of technical grade 48-52 per cent hydrofluoric acid with two volumes of water. Following this, parts are washed thoroughly in cold running water.

After the above treatments, a black coating is obtained on the parts by treating for 30 to 40 minutes in the following solution maintained at the boiling point (210-212°F):

Ammonium sulphate	4 oz/gal
Sodium dichromate	4 oz/gal
Ammonium hydroxide	1/3 fl. oz/gal
Nigrosine black W.S. dye (color index #865)	
or	
Indulin bluish W.S. (color index #861)	¼ oz/gal
pH 5.6-6.0	

Properly applied coatings will be a solid black.

Anodic Chemical Treatments—Magnesium alloys can also be coated with a dense hard coating by anodic oxidation in various alkaline hydroxide solutions. Several processes by which coatings of this type can be produced have been developed. The Dow No. 14 ac anodic finish uses a borate-silicate solution with alternating current. The coating produced is the most abrasion resistant of the chemical treatments available for magnesium and also has the ability to cover surface defects in die castings.

Solution has the following composition:

Phenol	1 oz/gal
Sodium hydroxide	1/3 oz/gal
Sodium metaborate	2 lb/gal
Sodium metasilicate	9 oz/gal

Phenol, which is solid at room temperature, is melted in half the quantity of hot water required. (Temperature above 106°F). The sodium hydroxide is added immediately with vigorous agitation. Sodium metaborate, sodium metasilicate, and the balance of the water are then added. Magnesium parts are suspended on both electrodes of a source of 120v alternating current, making certain that the surface areas of the work on each electrode are approximately equal. Parts which contain recesses must be racked so that no air or gas pockets occur during treatment. Loads should consist of one alloy only.

Agitated Bath—The anodizing bath is operated at 70-85°F and agitated, either by air or by a water cooling coil plus mechanical agitation. Racks and clamps for holding should be constructed of 0-1 or C magnesium alloys in areas below the bath level. Points must be kept sharp to maintain good electrical contact.

In carrying out the anodizing operation the voltage is raised from 0 to 110-120v at a rate slow enough that the recommended current density of 10 to 15 amp/sq ft of total work area will not be exceeded. As the coating forms, it becomes more resistant to current flow and the voltage must be gradually increased to build up the coating to the desired thickness. Time required for treatment ranges from 5 to 20 minutes depending upon the current density and the alloy being anodized.

Wax Cuts Smudging—Waxing of anodized parts is recommended to reduce smudging due to excessive handling. Since the coating is absorptive, wax tends to seal the coating. If painting is to be the next step, waxing is omitted, and the anodized parts are immediately given a neutralizing seal by immersing them 5 minutes at room (*Please turn to Page* 114)

TRADE DESIGNATIONS AND PROPERTIES OF CHEMICAL TREATMENTS FOR MAGNESIUM

Common Name	Army Navy Specification	American Magnesium Company	Dow Chemical Company	Dimensional Change	Rating of Protective Value (A—Best)	Abrasion Resistance (Hanetsen Values)
Chrome-pickle	MIL-M-3171 Type I	AMC-A	No. 1	0.0006"/surface	C	1
Sealed chrome-pickle	Type II	AMC-L	No. 10	0.0006"/surface	A	1
Dichromate	Type III	AMC-G	No. 7	Negligible	A	8
Alkaline dichromate		AMC-H	No. 8	Negligible	A	13
Galvanic anodize	Type IV	AMC-K	No. 9	Negligible	A	10
Bright pickle (chromic acid)			No. 15	0.0003"-0.001"/surface	B	1
Caustic anodize		AMC-R	No. 12	Negligible	A	25-35
Borate-silicate anodize			No. 14	Negligible	A	42

controlled or not...

CMP THINSTEEL TRADE MARK

gives you *more parts* per pound

CMP'S special high precision mills insure exceptionally-close thickness tolerances and across-the-width gauge uniformity in THINSTEEL. With oversize variation kept to the minimum you are assured more footage — as much as 175 square feet per ton in lighter gauges — as compared with a standard commercial product.

BOTH WERE ORDERED 3/4" x .015". BOTH WEIGH 1/2 OUNCE.

The tagged piece is precision rolled THINSTEEL and is slightly over 9½" long. The other is ordinary strip on the high side of the allowable gauge tolerance — .002" oversize — and is slightly less than 8½" long.

PRECISION COLD ROLLED CMP THE STRIP STEEL

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Phone: PLeasant 3-1291
THE KENILWORTH STEEL CO., 750 Boulevard, Kenilworth, New Jersey
Phones: N. Y., COrtlandt 7-2427; N. J., UNionville 2-6900
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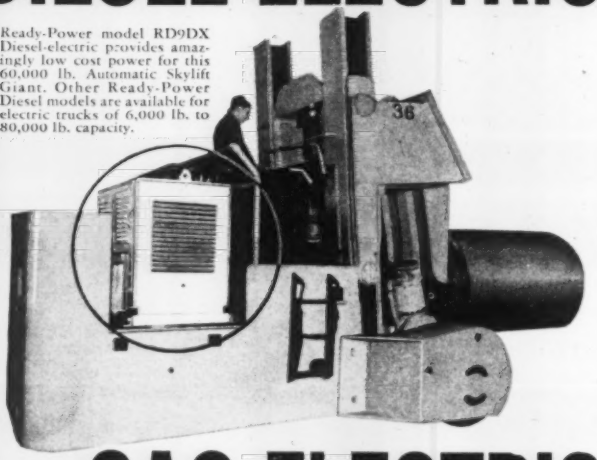
DIESEL-ELECTRIC

Ready-Power model RD9DX Diesel-electric provides amazingly low cost power for this 60,000 lb. Automatic Skylift Giant. Other Ready-Power Diesel models are available for electric trucks of 6,000 lb. to 80,000 lb. capacity.



or GAS-ELECTRIC

Equipped with the new Ready-Power gas-electric model H-A, this Lewis-Shepard fork truck can be operated 24 hours a day at peak efficiency. There are gas-electric models for all makes and types of electric trucks.

READY-POWER UNITS

FOR LOW COST,
CONTINUOUS DUTY
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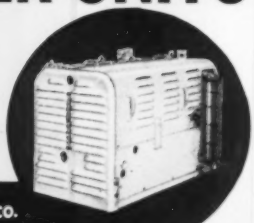
OPERATION



THE READY-POWER CO.

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Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

CALENDAR OF MEETINGS

September 21-23, National Association of Waste Material Dealers Inc.: Fall meeting, Saranac Inn, Upper Saranac Lake, N. Y. Association address: 1109 Times Bldg., New York 18. Secretary: Clinton M. White.

September 24-25, Steel Founders Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland 15. Secretary: F. Kermit Donaldson.

September 24-26, American Society of Mechanical Engineers: Petroleum Mechanical Engineering Division, annual meeting, Mayo Hotel, Tulsa, Okla. Society address: 29 W. 39th St., New York. Division secretary: B. B. Morton, International Nickel Co., New York.

September 25-28, American Society of Mechanical Engineers: Fall meeting, Hotel Radisson, Minneapolis. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

October 1-2, American Machine Tool Distributors Association: Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: 1900 Arch St., Philadelphia. Executive secretary: Thomas A. Fernley Jr.

October 1-4, Association of Iron & Steel Engineers: Fall meeting, Sherman Hotel, Chicago. Association address: 1010 Empire Bldg., Pittsburgh. Managing director: T. V. Ess.

October 2-4, Society of Industrial Packaging & Materials Handling Engineers: Exposition and "short course." Hotel Cleveland, Cleveland. Society address: 20 W. Jackson Blvd., Chicago. Secretary: H. E. Brill.

October 3-5, Pressed Metal Institute: Fall meeting, Drake Hotel, Chicago. Institute address: 13210 Shaker Square, Cleveland 20. Managing director: Orrin B. Werntz.

October 8-12, National Hardware Show: Grand Central Palace, Atlantic City, N. J. Managing director: Frank Yeager.

October 9-12, The Electrochemical Society Inc.: Centennial—Fall convention, Hotel Statler, Detroit. Society address: 235 W. 102nd St., New York 25. Secretary: Henry B. Linford.

October 11, American Iron & Steel Institute: Regional technical meeting, Hotel Warwick, Philadelphia. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

October 12-14, Metal Treating Institute: Annual meeting, Detroit. Institute address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herington.

October 13-14, American Welding Society: Annual meeting, Book-Cadillac Hotel, Detroit. Society address: 33 W. 39th St., New York 18. Secretary: J. G. Magrath.

October 13-14, American Society for Metals: Annual seminar, Hotel Statler, Detroit. Society address: 7301 Euclid Ave., Cleveland. Secretary: W. H. Eisenman.

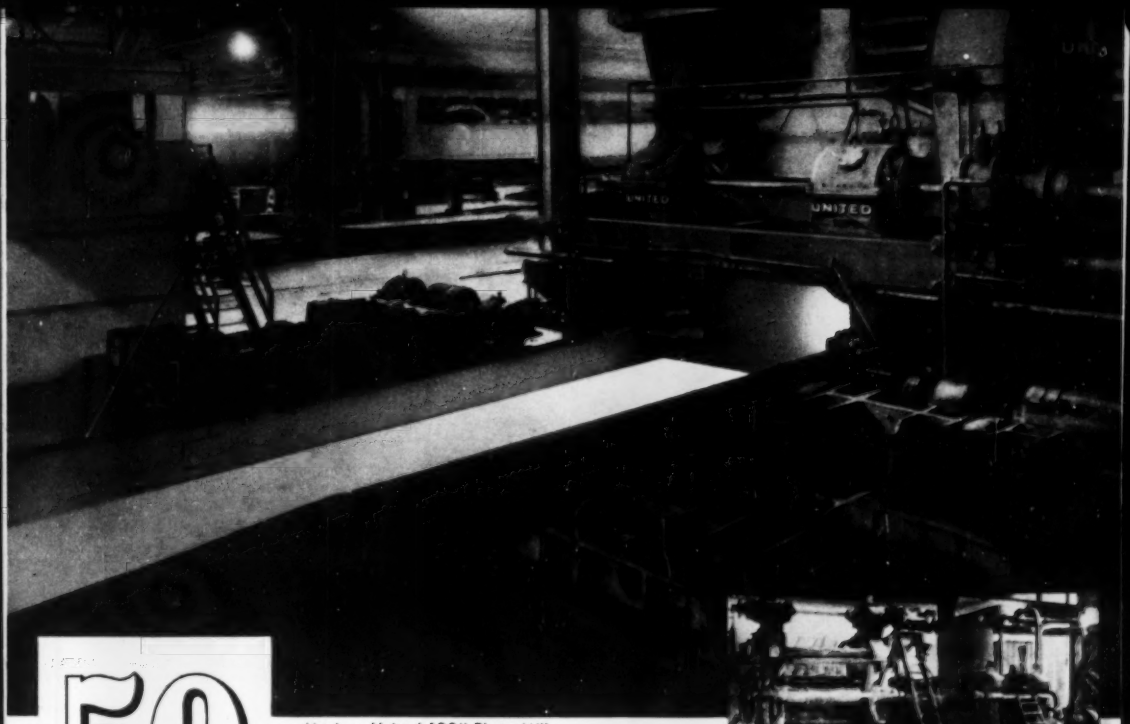
October 13-17, Packing Machinery Manufacturers Institute: Fall meeting, Mid Pines Club, Southern Pines, N. C. Institute address: 342 Madison Ave., New York 17. Secretary: Helen L. Stratton.

October 15-17, American Gas Association: Annual meeting, Kiel Auditorium, St. Louis. Association address: 420 Lexington Ave., New York 18. Secretary: Kurwin R. Boyes.

October 15-18, Society for Non-Destructive Testing Inc.: Annual meeting, Hotel Detroiter, Detroit. Society address: Box 710, Evanston, Ill. President: W. E. Thomas.

October 15-19, American Society for Metals: National Metal Congress & Exposition, Statler Hotel, Detroit, and Michigan State Fairgrounds. Society address: 7301 Euclid Ave., Cleveland. Secretary: W. H. Eisenman.

October 15-19, The World Metallurgical Congress: Hotel Statler, Detroit. Sponsored by American Society for Metals. Manager: W. H. Eisenman; director: Dr. Zay Jeffries.



50

Modern United 120" Plate Mill

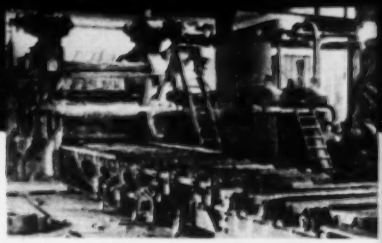


Plate Mill of about 50 Years Ago

YEARS AGO much of the World's Commerce was Carried in Wooden Ships

DEVELOPMENT of modern steel rolling equipment, such as the United plate mill shown above has made possible construction of the great all-steel ships that carry today's enormous seaborne tonnage.

As a major supplier of equipment for the steel industry, United is proud to have had a part in the development of metal rolling processes that have helped to render obsolete the wooden hulls of other days. A more evident example of progress would be hard to find. Steel is the framework of civilization.

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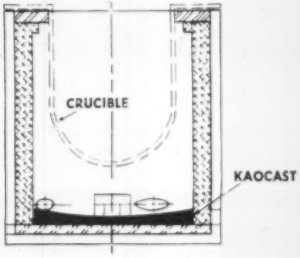
Golden Anniversary 1901 UEFCO 1951 REG. T.M.

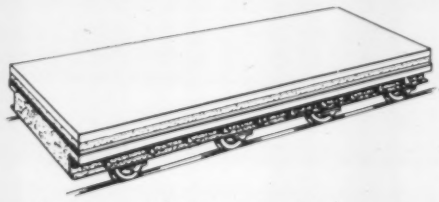
How you can profit with versatile KAOCAST

Since B&W put Kaocast on the market four years ago, this unique 3000F refractory castable has proved its economy and versatility in scores of high-temperature applications. Look at the capsule case studies on this page. Then consult a B&W Refractories Engineer on your specific requirements and see how Kaocast can save money for you.

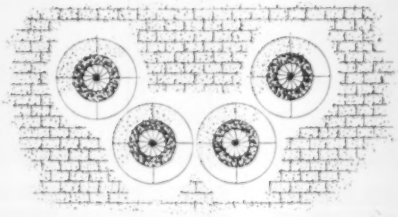
Used to line doors in 15-ton electric furnaces, Kaocast lasted three to four times as long as firebrick . . . cut overall costs in half.



In this magnesium-melting furnace the effect of molten metal previously necessitated replacement of the furnace bottom when the crucible was changed. This is no longer necessary with a lining of Kaocast because it stands up under the intermittent temperatures and has such high spalling resistance.



Kaocast was used for car tops in a ceramic tunnel kiln 150′ long. Ordinary fireclay castables crumbled in only a few trips and required continuous repair, but after 30 trips Kaocast showed no signs of deterioration.



Burner openings in a marine boiler furnace were made of Kaocast. Inspection a year later showed them in such good condition that Kaocast was used for the same application on other ships of the line.

KAOCAST FACTS

- Versatile Kaocast can be molded quickly and easily with your own labor. It can also be cast directly in place or applied by a cement gun.
- Kaocast eliminates an expensive inventory of special shapes. It speeds repairs and reduces costs.
- Kaocast has high resistance to spalling and slag attack, low volume change and negligible reheat shrinkage.
- Kaocast is available for prompt shipment.
- Kaocast is another example of how B&W sets new standards of performance and economy in the field of high temperature refractories.

WRITE FOR BULLETIN R-22

BABCOCK & WILCOX

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REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.

R-39B

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Continuous Heat Treatment Improves Pipe Physical Properties

This high-speed method, with its improved cooling rate utilizing a spray quench, produces full hardening without the use of alloying additions

By CHARLES A. TURNER JR.
Metallurgist
Solas Corp. of America
Philadelphia

CONTINUOUS heat processing of pipe by equipment integrated in the production line is producing pipe with superior physical properties, at high production rates and improved economies, as part of the answer to the seemingly ever-increasing demand for oil and gas casing, drill pipe and line pipe.

Steel industry records emphasize the increasing demand: Line pipe output in 1946 was less than 1 million tons; in 1950, more than 3.5 millions. Two per cent of total steel production in 1946 was line pipe; more than 5 per cent in 1950. Despite increases in capacity, only about half of the 1951 demand will be met.

Continuous heat processing of pipe, both seamless and welded, using high intensity radiant gas equipment that displaces batch equipment requiring long heating cycles, follows the strong trend toward continuous processing adopted for many large tonnage production operations throughout the steel and fabricating industries.

The first continuous strip mill was built in 1926 as the forerunner of other pioneering efforts in im-

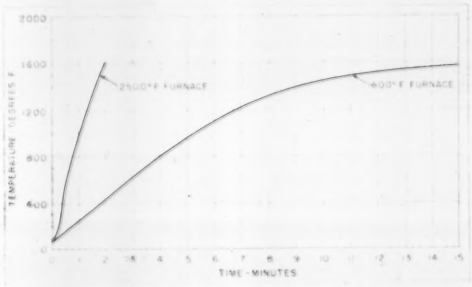


Fig. 1 (top)—Comparison of heating rates for 8⅝-inch OD by 0.320-inch wall line pipe when exposed to furnace temperatures of 1600 and 2500°F

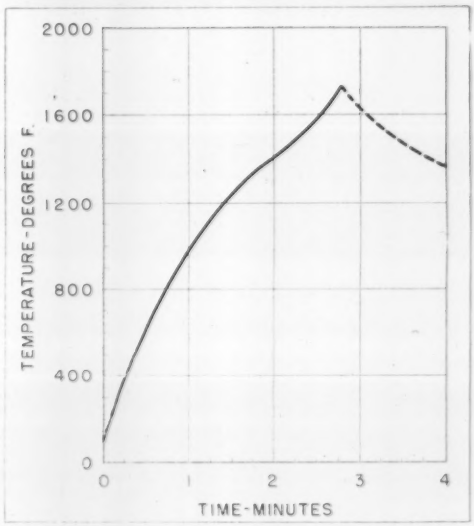
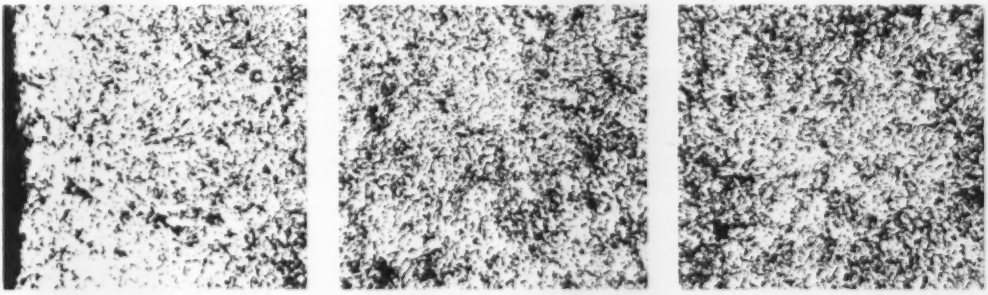


Fig. 2 (center)—Heating curve for normalizing test of electric-welded line pipe of 8⅝-inch OD by 0.320-inch wall



SECTION AT INNER SURFACE | MID-SECTION | SECTION AT OUTER SURFACE

Fig. 3 (bottom)—Photomicrographs of the transverse section through 5/16-inch wall of seamless casing after continuous heat treatment. Magnification 250X

proved production technologies. One of the more recent, the continuous seamless pipe mill, permits production of seamless pipe in multiple lengths and at substantial, constant tonnages in a wide range of diameters and wall thicknesses. The continuous electric-weld pipe mill is but one more example of straight-through continuous steel industry operation.

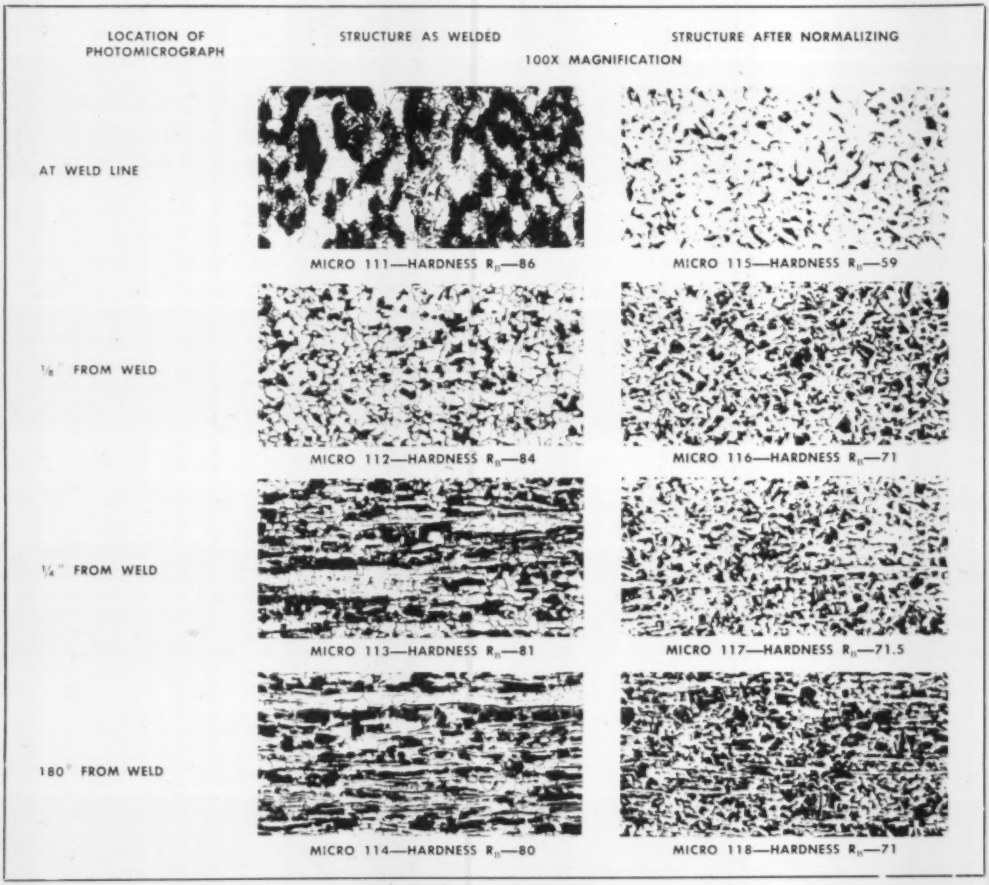
Heat processing of pipe has taken on a higher degree of subsequent operational importance since deeper drilling programs have been adopted by the oil and gas industry, transmission lines are longer and operating pressures higher.

Uniform Physical Properties Secured — An outstanding characteristic of pipe heat-treated continuously in a high-speed line is that of uniform physical properties. This results from uniform exposure of all portions of the full pipe length to both the heating and cooling medium. To avoid temperature differences resulting from variations in wall thickness, the final furnace zone is operated at the desired pipe temperature, thus serving as a soaking zone.

Pipe straightness is maintained by rotation in transit through the line. Spacing of support rolls and confinement of the heat to a limited portion of pipe length contribute to this straightness. Another factor, on quenched or air cooled pipe, is uniform heat removal about the periphery with the progressive passage of the heated pipe through the quench ring or over the cooling table.

Heating rates of 8⅝-inch OD by 0.320-inch wall line pipe when exposed to a furnace temperature of 1600 and 2500° F are compared in Fig. 1. Difference in heating times is striking. Tests have confirmed that fast heating does not produce a temperature gradient through the wall sufficient to be a detriment to pipe of this wall thickness. The slight difference in temperature is erased in the short soaking interval prior to emergence from the last furnace. Actual heating curve for this 8⅝-inch OD pipe heated in a 2300°F furnace is shown in Fig. 2. The retarding effect on

Fig. 4—Effectiveness of a short cycle, continucus normalizing treatment on the micro structure and hardness of 0.30 per cent carbon electric-weld tubing of 8⅝-inch OD by 0.265-inch wall is shown in these photomicrographs



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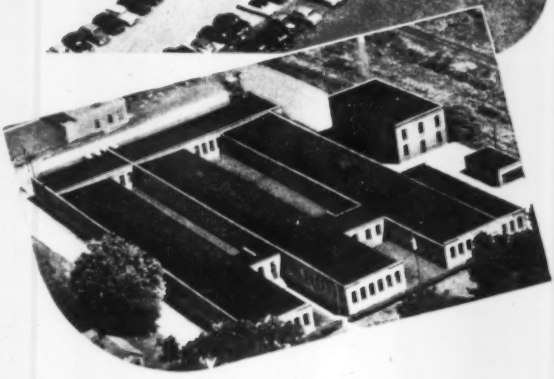

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heating rate due to heat absorption through the critical transformation temperature range is readily apparent.

Surface Oxidation Minimized—One important benefit of fast pipe heating in continuous, automatically-controlled radiant gas equipment is minimized surface oxidation. The short heating time and the controlled atmosphere with free oxygen eliminated, prevent scale formation which, in slow conventional treatments, promotes soft spots in quenching. A microscopically-thin oxide film in no way interferes with uniform cooling following heating. This rapid heating method also promotes a uniformly fine-grained structure with all attendent benefits to physical properties, notably impact resistance.

In the manufacture of pipe, selection of steel composition, processing method, or a combination of the two, is based on economy. Ultimate choices are controlled by the final least-cost of a product which will give satisfactory performance. Thus, the API (American Petroleum Institute) standard specification 5A for casing designates grade N-80 pipe for top physical properties—80,000 psi minimum yield, 16 per cent minimum elongation. Treatment and chemistry, other than phosphorous and sulphur, are optional with the manufacturer. Normally, requirements are met utilizing alloy additions in conjunction with an air-cooled heat treatment, or by a nonalloyed steel in conjunction with a controlled degree of cold work.

Through application of the continuous in-line high-speed heat treatment to seamless pipe, N-80 requirements are met without either the alloy addition or cold work processing. In fact, properties far exceed those resulting from the more conventional processing to the extent that no existing standard specification applies.

Continuous Processing Takes 10 Minutes—A comparison of heat-treating cycles between conventional and continuous processing will serve to point up differences in the methods. For batch treatments the following cycle is typical: Heat to 1575° F in 5 hours; hold at temperature 4 hours; water quench to 400° F; when equalized place in warm furnace; heat to tempering temperature in 3 hours; hold for 4 hours; air or water cool; and after straightening, stress

TENSILE AND HARDNESS TESTS
Electric Welded Tubing
4.0 x 0.125-inch Wall
As-Welded and After Normalizing

Location as Shown in Fig. 6	Yield Strength	Ultimate Strength	Per Cent Elong. in 2"	Rockwell Hardness
		As-Welded Tube		
				B 84
A	26,750	52,500	32.3	B 66–68
B	27,500	54,570	31.9	B 74–75
C	27,080	54,160	33.5	B 74–76
D	27,270	55,400	32.2	B 71–71
E	30,000	60,000	18.5	B 79–83
		Normalized 1650° F—15 Minutes		
				B 50
A	27,906	45,580	47.3	B 42–45
B	33,460	48,980	43.5	B 49–50
C	34,320	48,940	40.0	B 52–54
D	36,040	49,850	43.5	B 54–57
E	39,080	50,000	45.4	B 48–53
		Selas Short-Cycle Normalizing Treatment		
				B 59
A	41,430	49,380	44.0	B 48–54
B	41,770	53,100	38.0	B 55–60
C	43,970	53,940	37.0	B 57–61
D	42,110	52,980	37.0	B 55–58
E	43,290	53,600	38.0	B 56–60

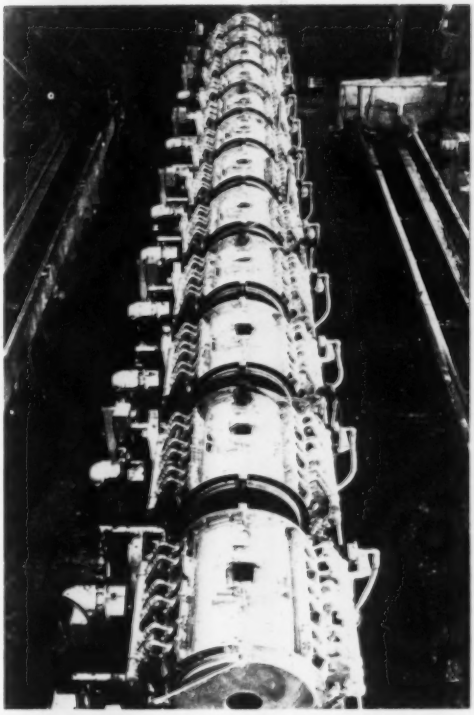


Fig. 5—Top view of a high-speed gas furnace line typical of those applied to the continuous heat treatment of pipe

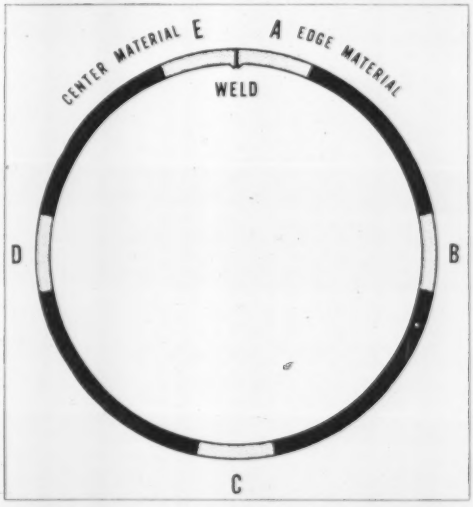
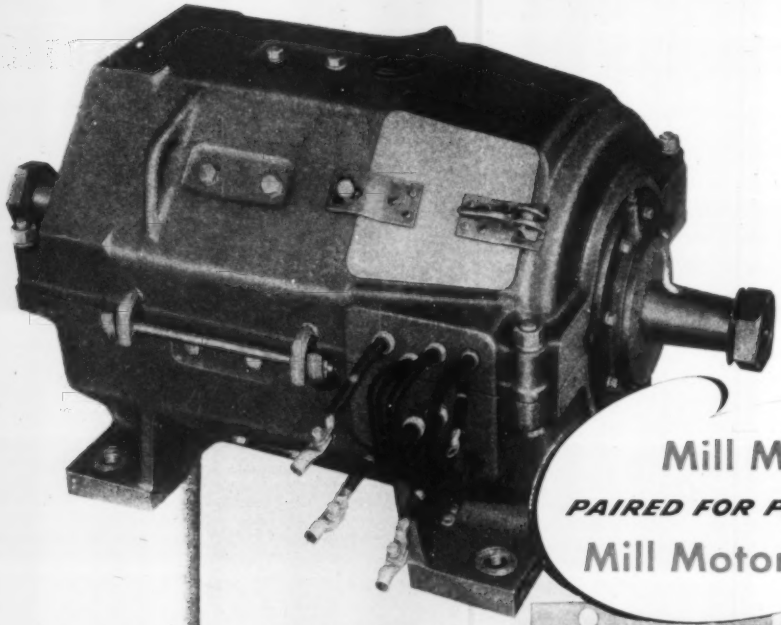


Fig. 6—Locations of tensile and hardness tests which are presented in the accompanying table



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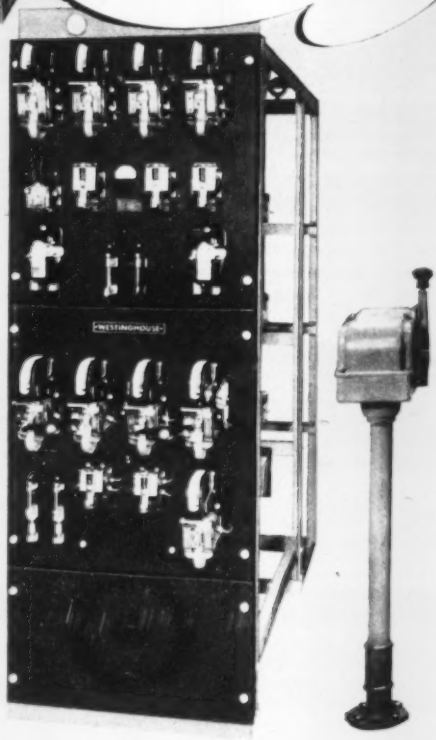

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relieve at 100° F below tempering temperature for 3 hours. Minimum total time is 19 hours.

For continuous treatment the following cycle is typical: Heat to 1575° F in 3 to 5 minutes (depending upon wall thickness); water quench to 120° F; heat to tempering temperature in 1 to 3 minutes; air or water cool. No stress relieving is required since little or no straightening is necessary. Total time is about 10 minutes.

In the batch method, utilizing a highly agitated water quench, full hardening through the wall section only results through addition of alloying elements which decrease the critical cooling rate.

The high-speed method, with its improved cooling rate utilizing the spray quench, produces full hardening without the necessity for alloy additions. Rapid tempering of the same hardened pipe results in improved ductility and higher yield strengths for the same hardness obtained by the slower heating method. In the absence of soaking, a higher tempering temperature may be employed to establish a given hardness level. This higher temperature promotes more complete relief of the residual hardening stresses, which in turn results in higher yield strengths.

Physical Properties Enumerated— Physical properties by rapid treatment therefore meet the minimum yield strength requirement at lower hardness levels, with correspondingly lower ultimate strength levels. When machining or threading is involved the lower hardness provides obvious advantages.

Continuously treated pipe with about 0.45 per cent carbon, 1.50 per cent manganese and 0.20 per cent silicon shows physical properties in the following ranges: Ultimate strength — 130,000/135,000 psi, yield strength — 110,000/118,000 psi, and elongation in 2 inches — 25/28 per cent.

Conventionally treated pipe producing the same yield strength will show higher values of ultimate strength and hardness and lower values for per cent-elongation with decreased toughness.

Microstructure through the casing wall section after rapid, continuous heat treatment is shown in Fig. 3. Effectiveness of the heating and quenching is indicated by the complete absence of free ferrite in the microstructure of tempered martensite. Application to deeper oil and gas well drilling is indicated. Economies are effected through elimination of expensive alloying additions.

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decreased handling in heat treatment, reduced straightening and improved machineability and threading. In these critical times, with many alloying elements in short supply, benefits of the method are magnified.

Considerable attention is being focused upon the application of continuous heating to line pipe produced by the electric-weld method. Manufacture of small diameter tubular products for mechanical purposes by means of electric resistance welding has been in use 30 years or more.

For such applications a low carbon steel (0.12 to 0.18 per cent carbon, 0.40 to 0.60 per cent manganese) is employed and usually post-welding heat treatment is necessary. With the present expansion of pipe producing facilities new mills are utilizing continuous units for forming line pipe in sizes from 4½ to 34 inches OD. Using plate for larger sizes and coiled skelp for smaller sizes, the cylindrical shaping takes place during travel through consecutive roll passes before entering the electro-welding equipment.

Chemistry Requirements Changed

With the currently higher internal pressures encountered in pipelines, steel chemistry requirements have changed. Higher carbon and manganese contents are required to meet increased yield strength specifications. In such cases metal in the seam area becomes hardened and stressed due to rapid dissipation of the localized weld heat by conduction to the colder adjacent metal. To relieve these stresses and provide uniform properties throughout its full section and over its entire length, the pipe must be normalized.

High-speed heating in continuous, automatically controlled straight-through equipment enables pipe to be normalized at speeds matching the welding speed, 100 fpm or faster. Pipe leaving the welder passes over a cooling table and enters a line of gas-fired chambers where it is heated rapidly and uniformly to a temperature producing full solution of the carbon and complete recrystallization of the heterogeneous grain structure. Leaving the furnace line, the pipe runs out on tables for uniform cooling.

Effectiveness of a short cycle, continuous normalizing treatment is shown by the series of photomicrographs in Fig. 4. The treatment has made a marked improvement in the structure through substantially complete elimination of the banded or laminated appearance. Banding is undesirable since it imparts more pronounced directional properties to the steel. The normalizing thus im-

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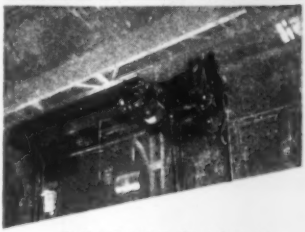

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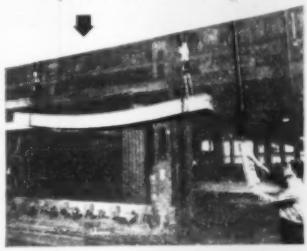

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proves the pipe's transverse properties, an important factor when considering the higher internal operating pressures. In addition, all traces of the original structure, as altered by the rapid cooling following welding, have been removed.

Tensile properties and hardnesses of 4.000 x 0.125-inch wall electric welded tubing in the as-welded condition and after normalizing are given in the accompanying table. For the latter treatment a comparison is made between short-cycle heating (66 seconds to 1650°F—no hold) and heating at more conventional rates (6 minutes to 1650°F—15 minute hold). Tubing was welded edge-to-center from skelp representing half of full width material. Difference in chemistry between edge and center of this low carbon steel accounts in part for the variations in properties.

The differences in physical properties between the two normalizing practices reflects differences in grain sizes, coarsening progressing as time is extended. The finer grain resulting from the short-cycle normalizing produces higher hardness, strength and yield-tensile ratio with but slight lowering of ductility. Both normalizing practices produced tubing that withstands flattening, flaring, flanging and crushing tests without splitting at the weld.

Continuous Equipment Described—The new continuous heat processing equipment consists of a series of small, radiant gas-fired chambers operating at high temperature, well above the pipe's peak temperature, to attain high heat-transfer rates. This heat release, as high as 500,000 Btu per cubic foot of combustion chamber, is produced by nozzle-mixed gas-and-air discharged under pressure from multiple ports of ceramic burners. The small high-velocity flames sweep rapidly over the burner cup cavities, with which the furnace chambers are lined. The burners function as radiant surfaces with closely controllable degree of incandescence, adjusted by the volume of air and gas mixture delivered to the burner ports.

Welded pipe is guided through the line by supporting rolls between furnaces. Automatic temperature control is achieved through radiation detecting elements co-ordinated with the gas-air mixture equipment and burners. These elements sight on a closed-end tube within the furnace to record and control furnace temperatures in the first heating zone of the line. In later stages, elements sighting directly on the pipe being processed control the temperature of the

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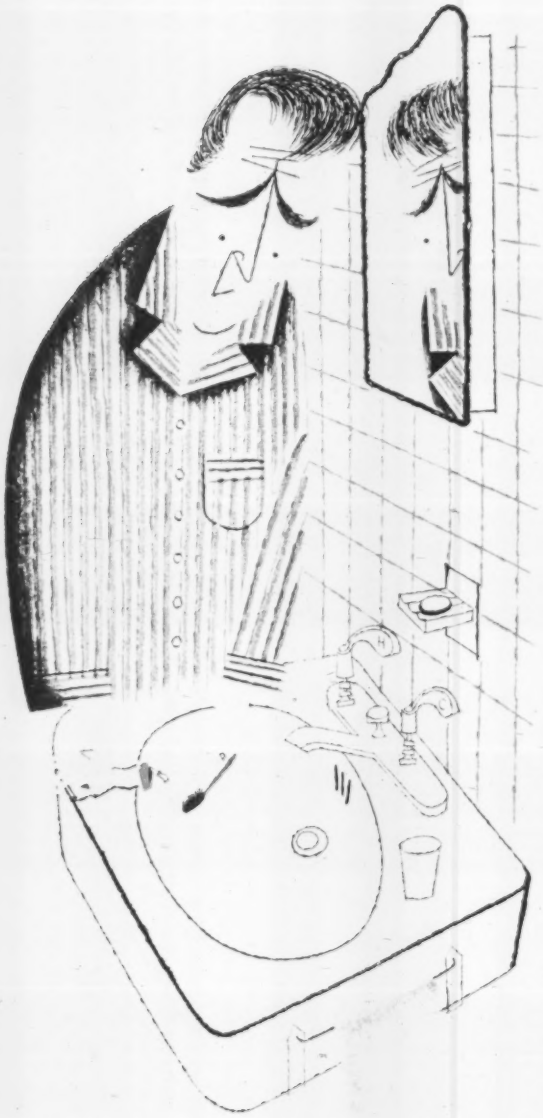

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following heating zones. Final tube temperature is taken and recorded from the pipe as it emerges from the last chamber.

Pipe may be either air cooled for normalizing or may be water quenched for hardening as part of the continuous processing. In the latter case, the quench consists of a circular head discharging water in a continuous ring through an annular orifice to provide extremely rapid heat extraction. Tempering, following this hardening, is accomplished by continuing the pipe's travel directly to a similar series of heating chambers which, through controlled temperature, provides the required physical properties. A furnace line of this type located in one of the large steel plant tube mills is shown in Fig. 5.

Tube System Speeds Reports

Installation of a 1000-foot-long pneumatic tube system between their casting shop and metals research department, speeds laboratory analysis of each heat and eliminates need for human messengers between the two operations at Scovill Mfg. Co., Waterbury, Conn.

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Formerly, a messenger was needed on each shift to carry samples and messages back and forth each hour. Now, samples are merely put in an envelope which is placed in a carrier and inserted in the dispatch tube. The carrier travels at a speed of 25 feet per second and is delivered into a receiving chute at the laboratory. Reports are similarly sent back by a return tube. From 100 to 200 tube trips are made per day and samples or messages can be dispatched at any time.

The new system, designed and installed by Lamson Corp., Syracuse, N. Y., is of particular importance in continuous casting operations. Rapid analysis and receipt of analysis reports are necessary in these operations to maintain the correct composition of the alloy and to enable any necessary corrective measures to be taken.

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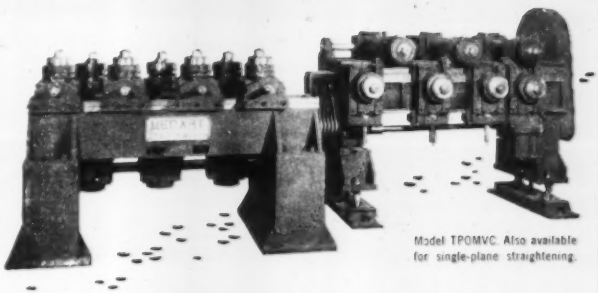

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Drill Press Feed Setup

(*Continued from Page 87*)

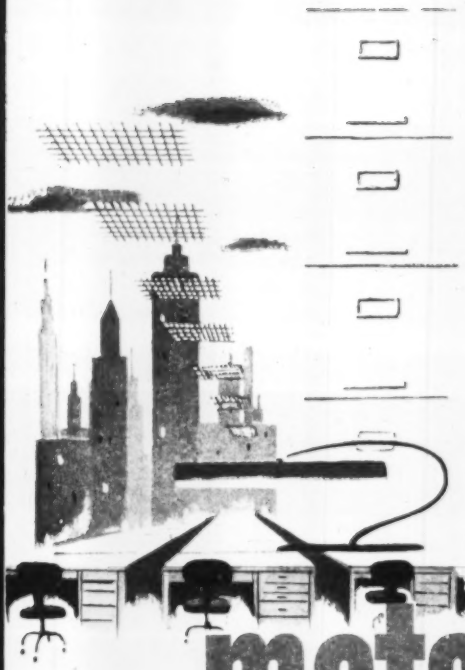
U-shape so as to grip the pins by heads, as shown in sectional view. Pins are put into the mouth of the chute by hand, six or eight at a time. From there on they feed down into the lower section by gravity.

As illustrated by the diagram—and detailed view thereon—this lower section is equipped with a device which hold pins in parallism until they reach the wheel. A trough, open at both ends, contains an endless web belt to which are fastened regularly spaced, contoured hardwood cleats. These cleats keep pins evenly separated. Weight of nine pins on the topside of the belt "powers" this little conveyor. One pin is picked up from the upper chute and one is loaded into a notch in the wheel each time the wheel indexes and the belt moves one step.

Steady Feed—This self-actuated conveyor belt eliminates possibility of jamming either in the chute or between chute and feed wheel. Thus it assures to the index wheel a steady, measured flow of stock "metered" by the wheel itself. Pins in the upper section are not liable to jam inasmuch as the chute—while it is vertical in one plane—curves slightly toward the operator in the other plane, thus causing the pins to contact each other at both ends. Total chute length is 18 inches and its capacity is 47 pins.

Main fixture consists of a base carrying the indexing and locking mechanism, a back plate carrying feed wheel; and the top member containing the drill bushing and also mounting a pressure pad which prevents pins from rotating during drilling. Feed wheel runs on two sets of sealed roller bearings mounted on a shouldered spindle. Wheel has eighteen 60 degree notches accurately cut on its periphery. These not only hold the pins but also these same notches serve to index the wheel and to lock it in position.

Indexing and locking mechanism is operated by a air cylinder activated by a microswitch. Switch is tripped by spindle-feed mechanism just before its full retraction. Spindle is fed down by a Bellows-Senacon air feed until drill has penetrated completely through the pin, then retracts sharply. As it nears limit of reaction, it trips the microswitch connected to the indexing cylinder. Held in the position shown in diagram during the drilling part of the cycle, the indexing piston is withdrawn sharply and snapped back when circuit is closed and reopened. As indexing piston moves away from the wheel, the cam bar is pulled along with it, thus camming



Functional beauty . . . lighter weight . . . greater strength . . . are only a few of the reasons why Van Huffel metal tubing and shapes make the "sky the limit" for designers of metal furniture. From office desks to day beds . . . from high chairs to hall trees . . . the list keeps on growing. As one manufacturer aptly put it, "You make in metal what we put on paper." Van Huffel is versatile.

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simplify the production
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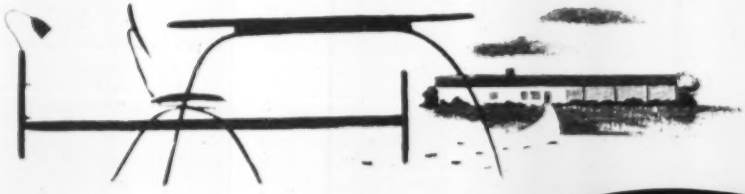
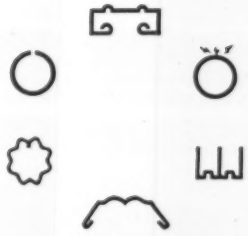
metal furniture





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lock bolt downward and out of engagement with the wheel.

This same retraction carries the pawl—which is pivoted on the cam bar—back far enough so that when the piston makes its return stroke, the pawl "picks up" a new notch on feed wheel. This pawl is tipped with a small block of hard rubber cemented in place. This buffer, which is replaced about once in two weeks, prevents wear on wheel and pawl. As the cam bar makes its return strike, lock bolt is forced up, seats in a notch and locks the wheel. Double feeding is prevented through accurate layout of the cam slot, together with braking effect on the wheel of the pressure pad which bears down on the top of the wheel.

Does Double Duty—This spring pressure pad not only holds pins securely in place during drilling but also compensates for any variations in pin size or wear in pin holding notches. Hole in pin is located from the head, the head being held in position between feed wheel and back of fixture. Pins arriving from feed chute are aligned by a cavity ground into the edge of the back, this being indicated on the diagram.

Feed wheel and back plate of the fixture are machine steel, carburized and pack hardened with 0.030-inch case, this being done before final finish grinding. Cam, pawl and lock are hardened tool steel. The fixtures, one right-hand, the other one left-hand, have wheels which rotate in opposite directions. The fixtures are mounted on the two drill-presses so that the one operator sits between them, loading the two chutes from tote-pans conveniently located for work handling.

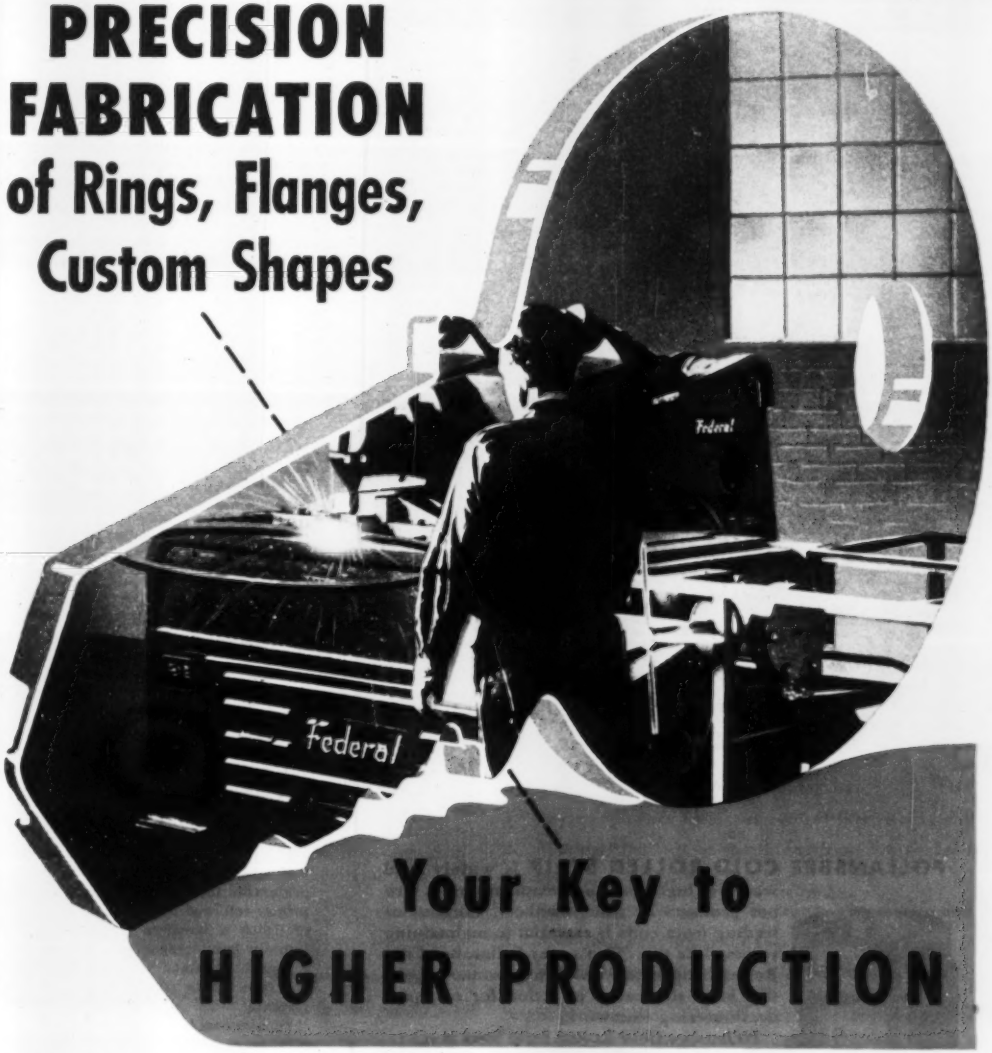
In case of drill breakage or any other malfunctionings, operator hits rapid return button on spindle feed mechanism. This stops the one machine. Operator usually can change the drill or otherwise service this machine and get it back into operation, before the other machine has exhausted its supply of stock. This setup has been in use for several months. Its performance is thoroughly satisfactory.

New Drop Table Catalog

Publication of a new 24-page, fully illustrated catalog on drop tables is announced by Whiting Corp., Harvey, Ill. Particular emphasis is paid to diesel shop installations.

A number of drawings supplement installation views and show a variety of possible, efficient combinations of body supports and different types of tables. Copies will be sent upon request.

PRECISION FABRICATION of Rings, Flanges, Custom Shapes



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Finishing Magnesium Alloys

(*Concluded from Page* 92)

temperature in a bath of the following composition:

Sodium dichromate	6¾ oz/gal
Sodium acid fluoride	6¾ oz/gal

After immersion, parts are rinsed in cold running water, then in hot water to facilitate drying.

The manodize process is another commercial electrochemical treatment used on magnesium alloys.

Primers for Painting—Generally, it is necessary to use primers to secure satisfactory adhesion of paint coatings to chemically treated surfaces, particularly when air drying systems are used involving lacquer finish coatings. A satisfactory primer of this type is covered by Army-Navy specification that is designated as AN-P-656.

Recently, several new primers such as Unichrome (United Chromium Co.) AP10 and Grand Rapids Varnish Co. No. 66-4005 zinc chromate primers have been developed which have excellent adhesion on bare or poorly chemically treated magnesium. In all but severe corrosive environments one coat of these primers can be substituted for a chemical treatment for approximately equal protective qualities.

Adhesion of the primers to bare metal after several years of exterior exposure is as good as that of the adhesion of the AN-P-656 primer to a good chemical treatment.

Normally, one or two finish coats of air drying lacquer or enamel is sufficient for normal indoor exposure. For exterior inland exposure, it is preferable to apply an inhibitive type primer followed by two or three coats of finish if lacquers are to be used. Usually two coats of enamel of the glyceryl-phthalate (alkyd) or phenolic type paints are sufficient for this purpose.

In seacoast or other corrosive atmospheres, three and preferably four coats of paint including one or two coats of zinc chromate primer are required. Finish coats of synthetic resin enamels based on phenolic or oil modified phenolic resin varnishes are preferable. Baking type alkyds or modified alkyds may also be satisfactory. Baking of the finish coats also improves their resistance to moisture.

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3. Bulletin No. DM113a—Published by Dow Chemical Co., Midland, Mich.
4. Diggin and Faulke, *Metal Finishing Guidebook Directory*—p. 344 (1949)

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Good technique and the right rod for the job reduce electrode waste

You can deposit more weld metal in less time and avoid wasting electrodes by using the right electrode for the job, approved techniques, and by following the manufacturer's recommendations. G-E electrodes give you high deposition rates, meet AWS specifications, and are available in a wide variety of sizes and types.

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4. **Protecting welding rods through better storage and care**
5. **Avoiding bending whenever possible**
6. **Using electrodes down to a 2-inch stub**

Bending electrodes wastes about $\frac{1}{4}$ of their useful length (Fig. 1) as does the habit of throwing away "long" stub ends (Fig. 2).

Fig. 1. *Three* electrodes used straight may give as much production as *four* which are bent before being used.

Fig. 2. *Three* electrodes burned down to a 2-inch stub may do as much as *four* when "long" stub ends are left.

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GENERAL ELECTRIC

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America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

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Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

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For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats. Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

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Alumina Capacity Increased

Plans for increasing the nation's alumina producing capacity by 180,000 tons annually, through the addition of new production facilities at an existing plant in Mobile, Ala., were recently announced by Allen B. Williams, president of Aluminum Ore Co., a subsidiary of Aluminum Co. of America.

Alumina (aluminum oxide) is the material obtained from bauxite ore as the major preliminary step in the production of aluminum and of alumina chemical products. About two pounds of alumina are used in producing one pound of aluminum.

The company is also currently erecting a new alumina works at Bauxite, Ark., in addition to operating plants at Mobile and at East St. Louis, Ill.

The new construction program, together with the capacity being added in Arkansas, will boost the Alcoa subsidiary's alumina production capacity by approximately 70 per cent when completed. Construction at Mobile is scheduled to begin in the immediate future, and production is expected to start by late 1952.

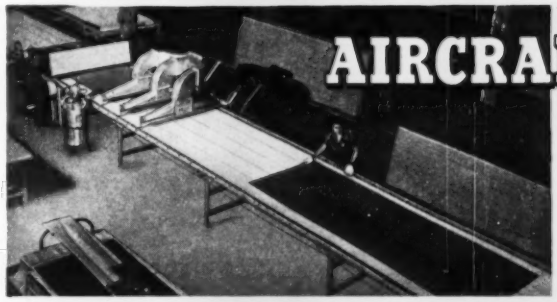
Stainless Handbook Offered

New stainless steel data and handbook has been published by Allegheny Ludlum Steel Corp. and is available for free distribution to users of the metal.

In order to fill the growing needs of fabricators and design engineers for more complete on-the-job reference data, material contained in previous handbooks has been completely rewritten and categorized and much additional information has been added. In its 120 pages the cloth-bound volume discusses approximately 40 different types of stainless steel and covers each from standpoints of analyses, fabrication, heat treatment and special conditions of service.

First seven chapters are concerned with selecting the proper type of stainless for a given application. A selector table containing about 30 types, including both nickel-chromium and straight chromium steels, lists about 40 properties broken down in the general classifications of physical data, electrical properties, heat resistance, working and treating temperatures, mechanical properties and creep strength. A second group of tables lists the steels' corrosion resistance to various media, including organic substances, acids and salts.

Subsequent chapters discuss each type of stainless separately in more detail and supply specific information about heat treating, fabrication and



Production increased — handling costs cut — in these and many other industries with Standard Conveyors.

The installations shown above are representative of the range and versatility of Standard Conveyors. An experience record of more than 45 years, serving all classes of industry and business, qualifies Standard to be of service on any conveyor need — roller, belt, slat, chain, wheel, push-bar, sectional, portable, self-contained conveyor units — pneumatic tube systems. Write —

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COPPER ALLOY BULLETIN

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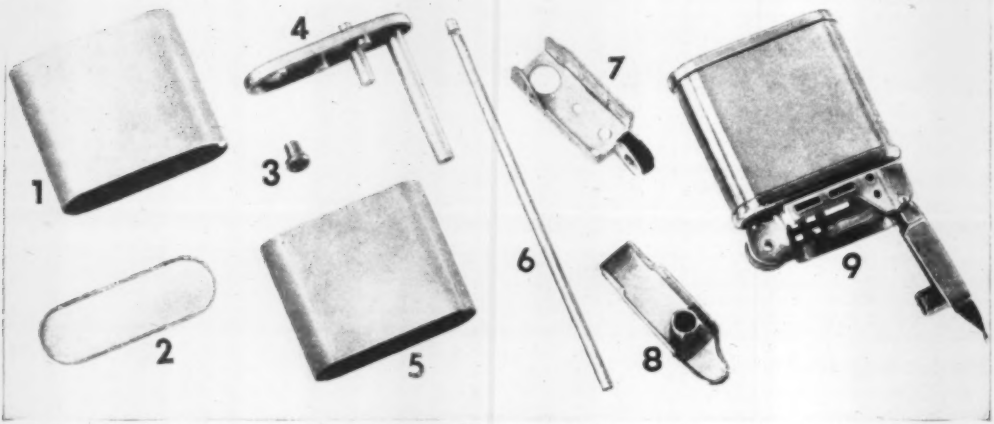


Parts and assemblies for pipe and cigarette lighter: 1. Outside body; 2. Base; 3. Bushing; 4. Top cover with wick and flint tubes and screw studs; 5. Inside body; 6. Jet tube with nozzle assembled; 7. Windshield with flint wheel assembled; 8. Snuffer assembly with snuffer and flat spring. Beattie Jet Lighter is shown at right – Courtesy Waterbury Lock & Specialty Co., Milford, Conn.

Accuracy Necessary to Produce Brass Parts for Jet Lighter

Accurate press, eyelet and screw machine parts, plus precision tubing are essential for both functional and assembly purposes in the illustrated pipe and cigarette lighter.

When the wick is ignited by the flint and the lighter tipped, the flame strikes the jet tube which has a wick inserted in it and runs down through the packing holding the lighter fluid. The heat causes the fluid drawn into the jet tube by the wick to change from a liquid to a gas, producing sufficient pressure to jet out a flame long enough to reach down into bowl of a pipe.

High Brass Used

The tubing, press and eyelet parts are made from high brass (65% copper, 35% zinc) for ease of drawing and forming, strength, corrosion resistance and suitability for buffing and plating.

The screw machine parts are made from free turning brass rod (61% copper, 3.4% lead and balance zinc). This alloy has the highest machinability rating of the copper-base alloys and also has the ability to accept and hold a plate.

Body Tubes Slip Fit

Two pieces of tubing (1 and 5) are held to tolerances which permit a slip fit to form the body of the lighter. To the outside piece of tubing is soldered the base (2), which is blanked, drawn, trimmed, then stamped with the name of the lighter and company.

The top cover (4) is blanked, cupped and trimmed. Four holes are pierced and the fifth is extruded to hold the bushing which takes the torch tube.

The two shortest screw machine pieces have blind tapped holes and a turned shoulder. These take screws to hold on the windshield. The longest rod is drilled through and tapped at one end for the flint adjusting screw. The second longest is drilled completely through to take the wick. All four parts are either swedged or staked into the cover. The bushing (3) is a press fit, and is produced in a screw machine.

Torch Nozzle Drawn

The jet tube (6) is reduced on one end over which is pressed the torch nozzle. At first it appears as though this part would be made in an eyelet machine but it was found that by blanking, cupping and drawing a more accurate fit would be maintained.

The nozzle hole is .004 in. in diameter. This hole is pierced with a special punch in a small press.

Accurate Forming Necessary

The windshield (7) is blanked, pierced and then two forming operations are performed. The forming is accurate enough to bring into alignment the two right-angle holes. The flint wheel is assembled into the shield with a small eyelet which is swedged over on one end after assembly.

The snuffer cover (8) is blanked, formed. Two piercing operations complete it. The snuffer itself is a screw machine part on which is turned a small diameter which serves as a rivet to attach the snuffer and the spring-tempered flat spring to the cover.

All assemblies on parts are nickel-chrome plated. (7227)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

DEZINCIFICATION CORROSION (Cont'd)

Resistance of Copper-Zinc Alloy Varies With Copper Content

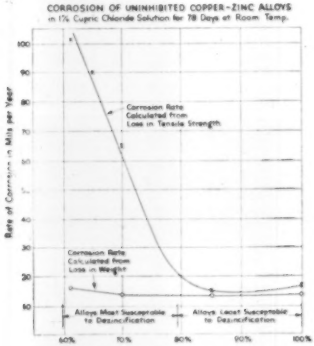
Uninhibited copper-zinc alloys and copper, corroded in 1% cupric chloride solutions at room temperature over a period of 78 days, resulted in the data graphically given in the following figure. In these tests the depth of corrosion was determined both on the basis of loss in weight and loss in tensile strength. The two values obtained were plotted against the copper content of the copper-zinc alloy tested.

Note that the curve for corrosion rate based on loss in tensile strength dropped rapidly with increasing copper content and flattens out at 85% copper.

The wide difference between the depth of corrosion based on loss of tensile strength and loss in weight for the alloys given on the left-hand half of this figure, is due to dezincification which lead to only a relatively small loss in weight but a large loss in tensile strength.

85% or More Copper-Zinc Alloys Most Resistant

The converging of the two curves indicates that where the copper content is 85% or higher, dezincification is not likely to occur. These results are confirmed by a large amount of empirical and service data.


CORROSION OF UNINHIBITED COPPER-ZINC ALLOYS
in 1% Cupric Chloride Solution for 78 Days at Room Temp.
Rate of Corrosion in Mils per Year
Corrosion Rate Calculated from Loss in Tensile Strength
Corrosion Rate Calculated from Loss in Weight
Alloys Most Susceptible to Dezincification
Alloys Least Susceptible to Dezincification
60%
70%
80%
90%
100%
Percent of Copper in Copper-Zinc Alloy

Spanner-Wrench Screws Answer to "Doodlers"

High brass, cartridge brass, copper and nickel silver spanner-wrench screws used in electrical equipment, institutions and hospitals to prevent removal by "doodlers". The special screw driver bit is shown at right. Courtesy Atlas Screw & Specialty Corporation, Waterbury, Conn.

The use of both wood and machine screws with spanner-wrench heads is increasing to prevent the "doodler" from removing them with fingernail files, knives and coins.

Instead of the conventional slot in the head, two small holes are drilled in a dial press to take a spanner-wrench bit. For strength, the center line of the holes is the same as the shank diameter of the screw under the head.

For the average application, either high brass (65% copper, 35% zinc) or cartridge brass (70% copper, 30% zinc) is used for the headed screw.

However, for electrical work, where manufacturers need high conductivity, copper is selected. It is a simple matter to drop solder into the spanner holes to further increase the difficulty of removing the screws.

Where the screws are used for attaching handles, dials, etc., nickel silver is the choice to eliminate the necessity of nickel-chrome plating to match the component.

Silicon bronze 609 (98% copper, 2% silicon) is selected where high strength and corrosion resistance is important. For resistance to corrosion from sea water, silicon bronze 813 (97.5% copper, 1.5% tin, 1% silicon) proves highly satisfactory. This alloy has physical characteristics similar to alloy 609 and is used for similar applications.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Portable Stud Welder quickly joins studs ranging from 0.060 to ½ inch in diameter to flat or curved sheets. Both ferrous and nonferrous metals can be welded in many combinations. Operating on air pressure and 110, 220 or 440 v.a.c. electric power, the portable unit requires only a 20 x 20 inch work area. The gun, which operates independently, reaches easily into otherwise inaccessible places. **No. 1171**

Heat Exchanger Tube Cleaner is driven by positive air motor, cleaning straight tubes from ⅜" to 3" in diameter. The drill type tool scavenges with either air or water, and is said to operate on air pressures as low as 50 psi. Hollow shafting is available in one piece up to 20 ft. in length, or in threaded sections. **No. 1172**

Rubber-Cushioned Collet Chuck is provided with a small locking nut that is said to hold tools securely. A rubber cushion is set into the upper recess in the chuck body to prevent damage to double-end milling cutters and long tools. The chuck is available in sizes from ⅛" to 1½". **No. 1173**

Production Honing Machine finishes bores up to 4" in diameter and up to 2" long. Both the rotating and reciprocating motions of the machine are powered by a single motor mounted on spindle housing. Positive stroke is adjustable up to 2". Expansion of tool can be regulated either manually or with hydraulically controlled microdial. Machines can be furnished with automatic loading and work ejection, and for high production, four to six units can be mounted on a single rotating base. **No. 1174**

Sheet Metal Grippers hold parts for riveting, without the use of springs or special tools. The units hold sheets between the end hook of center spindle and the gripper frame, held down by a screw knob. No pliers or other special tools are needed. The grippers are available for 3 32, 1 8, 5 32 and 3 16 inch holes. **No. 1175**

Running-Time Recorder is said to determine total machine operating time within a few seconds. Both "on time" and "time off" periods are shown in hours, minutes and seconds. Models are available for wall, flush panel or portable use. **No. 1176**

Top-Loading Drill Fixture loads and unloads quickly. When operating handle is turned, bushing plate lifts and swings aside automatically. When handle is reversed, the bushing swings back over the workpiece and locks in clamping position. Closed position alignment is maintained by two hardened and ground steel pins. **No. 1177**

Strip Stock Reel feeds automatic punch presses by allowing material to uncoil from horizontal position on ball bearing mounted turntable. The reel is propelled by the natural spring of the material, which develops torque as it uncoils. Exact feed requirement is said to be maintained by internal brake action of the material on center of the coil. **No. 1178**

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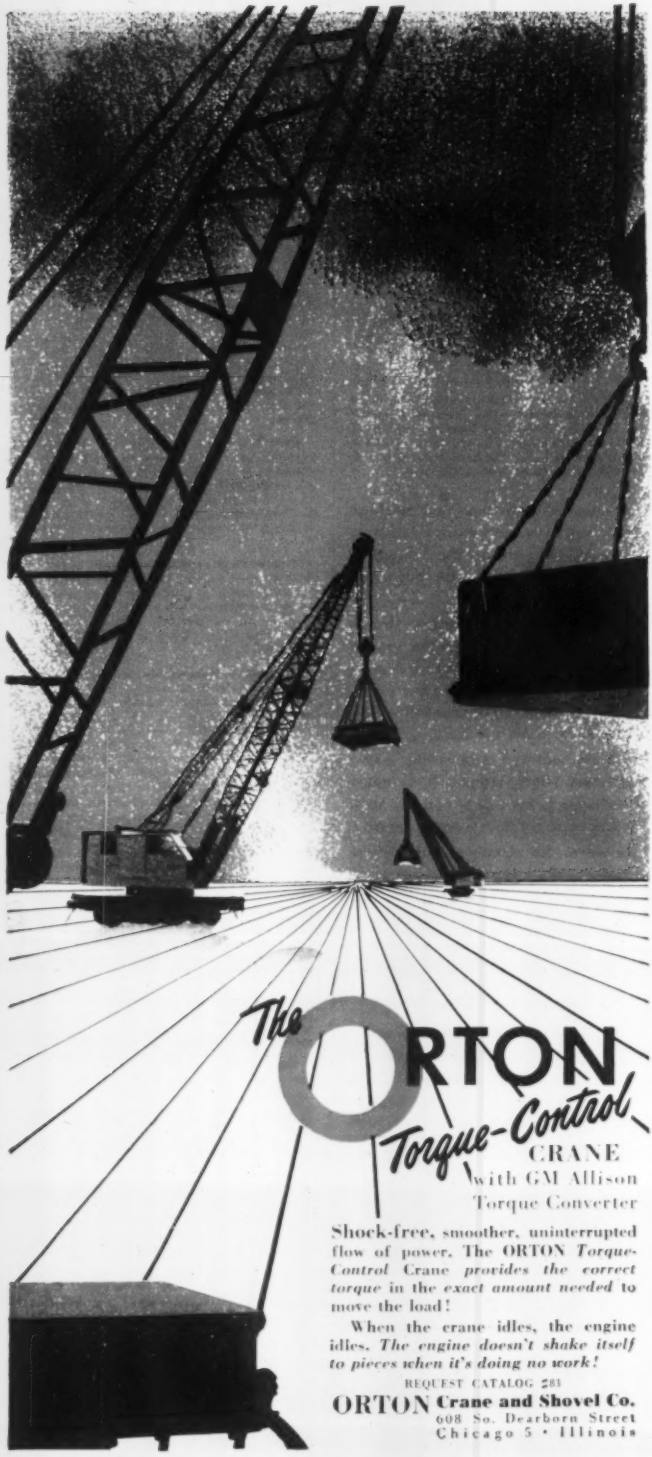

The ORTON
Torque-Control
CRANE
with GM Allison
Torque Converter
Shock-free, smoother, uninterrupted flow of power. The ORTON Torque-Control Crane provides the correct torque in the exact amount needed to move the load!
When the crane idles, the engine idles. The engine doesn't shake itself to pieces when it's doing no work!
REQUEST CATALOG 283
ORTON Crane and Shovel Co.
608 So. Dearborn Street
Chicago 5 • Illinois

certain special conditions in service. Separate chapters are given over to discussions of heat resistant and low temperature properties of the metals. Copies may be obtained from 2020 Oliver Bldg., Pittsburgh 22.

Machining Research Published

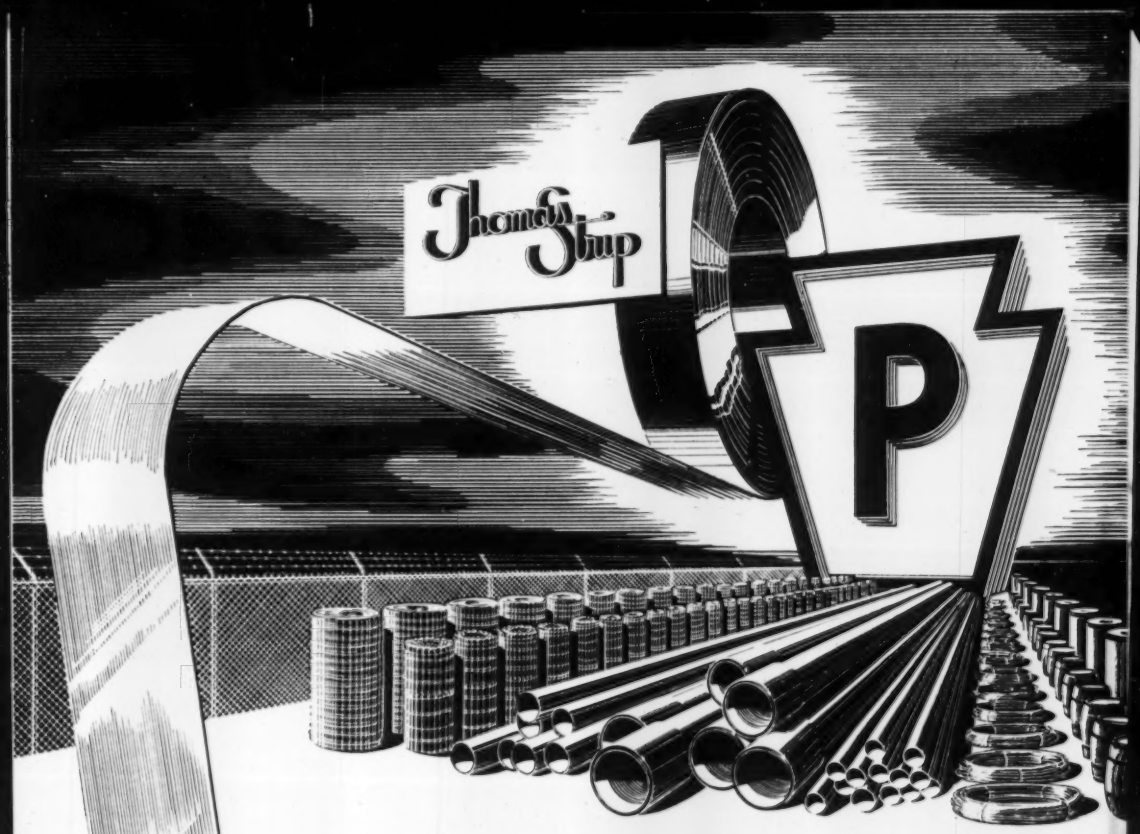
A newly-available preliminary report on the machinability of high-temperature alloys is featured in the August, 1951 issue of the *Technical Reports Newsletter*, just released by the Office of Technical Services of the United States Department of Commerce.

It covers one phase of a U. S. Air Force research program to determine requirements for the highest production at lowest cost in the machining of metals, and presents unpublished data on the best way to machine high-temperature alloys, cast iron and steel in view of their microstructures.

Other items reviewed: Bacteriological retting of ramie fibers; direct current electric motors; dust control;

Special Punch and Die for Plate

FORMING six 38-inch square, 3-11/16-inch thick plates of type 347 stainless steel to a 22½-inch radius called for the design and construction of a special cast steel die and punch for use on one of the 1500-ton presses at National Supply Co.'s Torrance, Calif., plant. Plates were pressed into shape after preheating to 1700°F. They were formed for an exploded cube layout of a sphere and welded together by Research Welding & Engineering, South Gate, Calif., (see STEEL, Mar. 26, p. 82). The sphere is used for storing liquid nitrogen under a pressure of 5500 psi at a temperature of minus 340°F. It weighs 7500 pounds and was subjected to a hydrostatic test at 10,000 psi and other tests prior to delivery to the Air Force for use in experiments with rocket propelled aircraft



Progress in Steel—

Pittsburgh Steel Acquires Thomas Steel Company

For the first time in its fifty-year history, Pittsburgh Steel Company is now a producer of flat rolled steel products. This has been made possible by the acquisition of Thomas Steel Company—a move that is a part of Pittsburgh Steel's Program of Progress.

For twenty-five years the organization that is now the Thomas Strip Division of Pittsburgh Steel has led the field in the production of quality steel strip. This group also has pioneered in the pre-coating of strip electrolytically with zinc, copper, brass, nickel and chromium—as well as hot dip tin, lead alloy and lacquer coatings. They bring to Pittsburgh Steel an intimate working knowledge of specialty flat rolled steel production.

By joining forces with Pittsburgh Steel, the Thomas Division is now part of a fully integrated operation. This acquisition brings to customers of Pittsburgh Steel a new product—cold-rolled strip steel.

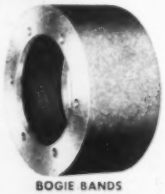
Pittsburgh Steel Company

Pittsburgh, Pennsylvania

IN TIMES OF EMERGENCY—

Cleve-Weld helps manufacturers meet important deadlines

● Yes, when government orders come pouring in, armament manufacturers naturally call on Cleve-Weld to fill their circular rolled and welded steel products requirements. Cleve-Weld is already producing these products for aircraft, tanks, armed vehicles and other armaments. Since Cleve-Weld is industry's mass production ring specialist, you also may well realize a savings on your circular weldments. Specialization plus Cleve-Weld's years of experience enables us frequently to quote you a lower price than your own internal cost estimates. It will pay you to contact us about circular rolled and welded steel products for emergency or peace-time needs. A new catalog has recently been produced containing complete data on our facilities and products! Write for your copy today.


BOGIE BANDS

STAINLESS STEEL RINGS

TURRET RINGS
(up to 100" in diameter)

THE CLEVELAND WELDING COMPANY
West 117th Street and Berea Road • Cleveland 7, Ohio
a subsidiary of
AMERICAN MACHINE & FOUNDRY COMPANY

seismic bar-magnet velocity meter; nickel-cadmium storage battery; manufacture of cooked potato products and self-luminous dials.

Single copies are available without charge from the Office of Technical Services of the United States Department of Commerce, Washington 25, D. C. or from Department of Commerce field offices.

New Machine Care Campaign

Scarcity of steel and other metals continues to stimulate a campaign of "Machine Care for Longer Wear" by Caterpillar Tractor Co., producing new techniques to keep veteran machines in operation. Most recent contribution is a weld-on plate for resurfacing track links worn too deeply for the successful use of weld overlays. Applied to D7 and D8 tractors, it is possible to resurface track links worn in excess of $\frac{3}{8}$-inch.

Track-type tractors roll on the steel rails formed by the track links. The company applies induction hardening to the rail surfaces, so that wear normally appears only after thousands of hours of usage.

The weld overlay is a method they developed earlier to restore the surface of worn parts, and is recommended for use as soon as track links are worn through their original surface hardness of about $\frac{1}{4}$-inch.

Successful overlays are possible up to three thicknesses, or about $\frac{3}{8}$-inch. Beyond this point, track link plates are estimated to be more economical for the D7 and D8. Made of hardened and tempered steel, these plates resist abrasion and shock.

Putting the program into operation, Caterpillar dealers now offer such parts rebuilding services as described above.

Pyrometer Bulletin Issued

Bristol Co., Waterbury 20, Conn., announces a new free bulletin that describes its line of millivoltmeter-type indicating pyrometers and pyrometer controllers for temperatures up to 4000° F. Indicating pyrometers for wall, switchboard, and flush-panel mounting, and for portable use are described and illustrated. Also shown are rotary and toggle switches for use with these pyrometers where a number of temperatures in an oven, furnace, or process are to be measured with one instrument.

Information is also given on automatic pyrometer controllers for use with gas, electric, and oil-fired furnaces. Full-size reproductions of indicating scales for both indicating and controlling pyrometers are included.

Also a new 24-page bulletin on

5 OPERATIONS ELIMINATED

ON ONE COMPRESSOR SHAFT

with GROUND and POLISHED

STRESSPROOF®

REPLACED *ALLOY* STEEL!

Originally, this compressor shaft was machined from A1615 alloy steel, then carburized, quenched, cleaned, straightened, and ground twice. When the manufacturer changed to new *Ground and Polished STRESSPROOF* for this part, machining was the only operation required—all other operations were eliminated! The result: faster production and an over-all savings of 59c per shaft.

This case is typical of the dramatic results possible with *Ground and Polished STRESSPROOF*—the finest ground bar steel produced. This bar eliminates many costly manufacturing operations because of its unique combination of four important qualities in-the-bar: strength... wearability... minimum warpage... accurate polished surface. And this sensational steel machines fully 50% faster than heat-treated alloys of the same hardness!

INVESTIGATE, NOW!

Most of today's Ground and Polished STRESSPROOF is going into defense jobs. Occasionally some sizes of bars are available for testing purposes.

La Salle STEEL CO.

1414 150th Street, Hammond, Indiana

Manufacturer of the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Bars in America

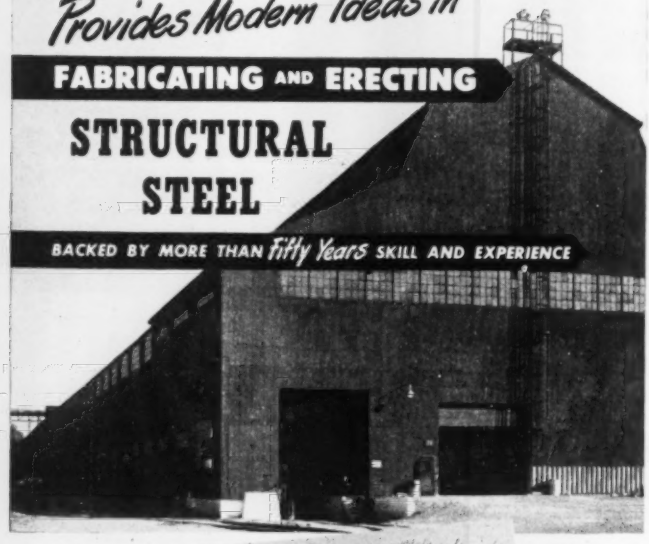
FORT PITT BRIDGE

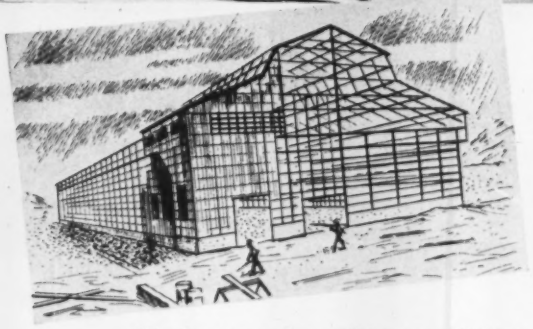
Provides Modern Ideas in

FABRICATING AND ERECTING

STRUCTURAL STEEL

BACKED BY MORE THAN *Fifty Years* SKILL AND EXPERIENCE





Whether your plans call for an addition to your present facilities, or a completely new structure—take advantage of the skill, experience and practical help Fort Pitt Bridge can provide. Let our engineers help you in the early planning stage.

"STEEL PERMITS STREAMLINING CONSTRUCTION WITH SAFETY, ENDURANCE AND ECONOMY"

WHEN PLANNING TO USE FABRICATED STEEL—THINK FIRST OF

FORT PITT BRIDGE WORKS

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General Offices: Pittsburgh, Pa. • *Plant at* Canonsburg, Pa.

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New York, N. Y., 441 Lexington Avenue • Cleveland, Ohio, Bulkley Building • Detroit, Mich., New Center Bldg.

automatic, continuous measurement and control of pH in industrial processes is available. It describes their full line of recording and controlling instruments for pH, including the electronic Dynamaster strip-chart instrument. Complete specifications are given on glass and calomel electrodes in several different models for both immersion and flow uses.

Also contained are illustrations and descriptions of a number of applications of the pH instruments for water treatment, industrial waste disposal, and in the chemical, petroleum, paper, textile, and metals industries.

Powdered Core Problem Solved

A confusing situation has existed for some time in the electronic core industry. Manufacturers of iron powder and other powdered magnetic materials used in electronic cores established properietary designations for their materials. At the same time, the fabricators of the cores also established different designations for their products depending on the raw materials used the electrical characteristics desired. As a result, the purchasers and users of electronic cores were faced with the problem of trying to correlate designations of the various companies with the raw materials used and also compare one company's products with that of another.

This problem has now been eliminated. The Metal Powder Association, through its standards committee, has issued data sheet No. 1 which cross-references designations of the basic electronic core materials with the corresponding designations of eight of the leading core manufacturers. It is now possible to determine at a glance who makes cores from any of twenty-five different basic materials; what their core designation is; and what corresponding designations are used by other core makers. Copies may be obtained by writing to the association, 420 Lexington Ave., New York 17.

Controlled Volume Pumping

An illustrated, 24-page, two-color bulletin on controlled volume pumping has recently been published by Milton Roy Co. It will be of interest to industrial plants whose operations call for pumping a controlled volume of liquid in amounts as much as 50 gallons per minute or as little as 3 milliliters per hour.

The bulletin gives complete details on controlled volume pumping, and includes data required for selecting their equipment for specific applications. Uses are given for these pumps in the chemical, textile, petroleum,

Versatile BLISS Hydraulic allows unusual metal design

A new 600-ton Bliss double-action hydraulic press enables Carrier Corporation to produce the smooth-looking, but hard-to-make contours for its extensive line of air conditioners.

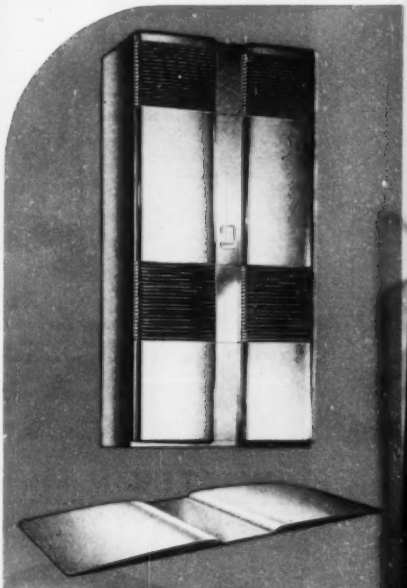
"By varying ram, blankholder, and cushion pressures and the draw cycle, we have been able to complete difficult drawing operations with sharp corners and small radii at the bottom. The press' flexibility also enabled us to use, more successfully than ever before, steel sheets which remained in stock for a long period, some showing evidence of open grain structure. Actually the press has exceeded our expectations," reports George R. Auld, Carrier's Vice President of Manufacturing.

The press has been operated continuously on a 24-hour basis at maximum speed—*without missing a stroke*. No adjustment or maintenance attention was necessary. "At no time has the press ever been down due to its own inability to operate," says Mr. Auld.

This is another "live" example of what Bliss engineers mean when they promise "the right press for a given job." It's your guarantee of equipment precisely suited to your requirements, whether it's a single press—mechanical or hydraulic—or a complete stamping plant.

E. W. BLISS COMPANY, CANTON, OHIO

Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery



Hard-to-make contours in this center section stamping for a Weathermaker are drawn from 20-gauge steel at a rate of 1800 daily.

Top panel for window model Room Air Conditioner has intricate contours, sharp corners and bottom radii. Produced at rate of 1,200 per eight-hour shift from .018-gauge steel.

1,200 14-gauge drip pans are drawn and formed daily in this Bliss press which has 200 tons blankholder pressure and 400 tons plunger capacity.

From a single press for a given job . . . to a complete press room . . .

It's Bliss

make your PUNCH PRESSES *Automatic*

It's Easy...with WITTEK Roll Feeds and Reel Stands

Wittek Roll Feeds handle any type of coiled strip stock and are made in single roll, double roll, and compound types with straighteners, in models to feed in any of four directions. They are reliable and accurate with simple, quick adjustment of feed length. Standard sizes and models meet a wide variety of press size and capacity conditions.

Wittek Reel Stands facilitate handling coiled stock.

*Write for full particulars

WITTEK Manufacturing Co.
4328 W. 24th Place, Chicago 23, Illinois

Automatic ROLL FEEDS AND REEL STANDS WMCO

Profit from FEWER OPERATIONS and COMPLETE CONTROL OF MACHINING—

with **WYCKOFF**
Cold Finished Steel
CARBON and ALLOY

COLD FINISHED STEEL

Four CONVENIENT MILLS TO SERVE YOU!

WYCKOFF STEEL COMPANY
FIRST NATIONAL BANK BUILDING · PITTSBURGH 30, PA.
3200 S. KEDZIE AVENUE · CHICAGO 23, ILLINOIS
Works at: Ambridge, Pa. · Chicago, Ill. · Newark, N.J. · Putnam, Conn.

food and beverage, water treatment, pulp and paper, paint, pharmaceutical, and brewing industries and in instrumentation, pilot plants, and laboratories. Summarizing industry-wide data, four pages of color charts show in dramatic "stop-go-caution" style the relative corrosion resistance of the pump's construction materials to over 170 chemicals.

Copies may be obtained from the company, 1300 East Mermaid Lane, Philadelphia 18.

Castings Porosity Eliminated

A method of eliminating porosity in alloy castings and fiberglass laminates is available on a custom service basis in 30 industrial areas. The process was developed by Western Sealant Inc., Culver City, Calif., and has been used by West Coast manufacturers of aircraft, hydraulic, pump and radar equipment.

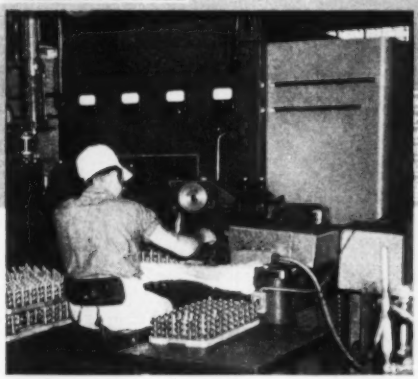
Approved by Army, Navy, Air Force and specified by prime defense contractor engineering process bulletins, the entire treatment is available in most industrial areas on a 12-24 hour service. Parts show no discoloration or visible results of treatment and critical machined tolerances are unaffected. Method may be applied to both machined and rough parts, before or after final finish coatings. Seal is resistant to wide temperature ranges, chemicals and solvents, plus having high dielectric properties.

Metals Cleaning Detailed

Specialized materials, procedures and equipment for use in cleaning metals, preparing metals for finishing and for other cleaning and related processes involved in aircraft production are covered in a 48-page booklet issued by Oakite Products Inc. Based on actual, successful applications in leading aircraft manufacturing plants, the booklet reports in detail on specific materials and methods for performing a wide range of production cleaning and related operations. Among the many operations on which helpful data are provided are: Preparing aluminum for anodizing, spot welding, and painting by still tank method and spray washing machines, cleaning aluminum before and after heat treating; stripping paint from aluminum; cleaning magnesium for finishing; treating wash water in paint spray booths; cleaning aircraft metals for inspection and assembly; and other operations.

Also presented in the booklet are helpful recommendations on equipment designed to simplify cleaning and rinsing operations, save man-hours and materials, and assure desired end results with maximum econ-

Why MAYTAG uses RF HEATING for BETTER, FASTER, CHEAPER PRODUCTION



● The Maytag Company has found, for fast production at low cost and high quality, Westinghouse RF Heating installations are the answer.

The installation of a process using two 20 KW-450 KC generators—for both spline and straight shaft hardening—has paid for itself in *less than 3 months!* This was shortly after World War II, and since then, continued use has piled up real profit in savings.

In building a new plant for production of a completely new line of automatic washing machines, Maytag turned to induction heating for brazing and hardening . . . and they specified Westinghouse. A 50 KW and 10 KW RF generator, with associated work handling equipment, are now accounting for still further savings and continued high quality. That's why Maytag says that not only is the Westinghouse RF process the best method for heat treating production parts, but also "it produces precision work at the price of rough and ready work."

As we helped Maytag, let us help you solve your problems of increased production at low cost and with high quality. Investigate the possibilities of installing Westinghouse RF Heating now. Send for our Induction Heating case history book, B-4792. Write to Westinghouse Electric Corp., Dept. S-9, 2519 Wilkens Ave., Baltimore 3, Md.

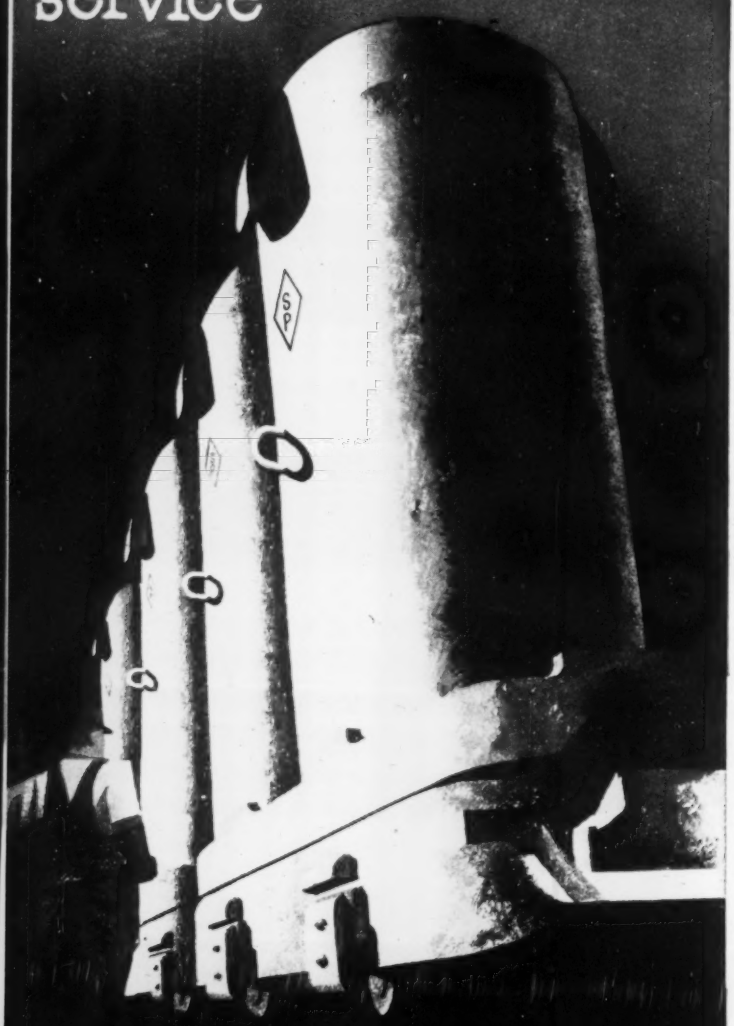
J-02230

YOU CAN BE SURE...IF IT'S

Westinghouse

INDUCTION HEATING

experience
skill
service



three priceless assets
behind every
SHENANGO·PENN MOLD
SHENANGO-PENN MOLD COMPANY OLIVER BUILDING PITTSBURGH, PENNA.

omy. Free copies of the booklet may be obtained by addressing Oakite Products Inc., 134E Thames St., New York 6.

Ammunition Heat Treatment

A new illustrated brochure describes fuel-fired batch and continuous furnaces used in the production of small caliber ammunition.

Heat treating furnace equipment required at each consecutive step in the production of a finished round of ammunition are included. Step-by-step, from raw material to finished product, the heat treat processes required for steel projectiles, steel and brass cartridge cases and cartridge belt clips and links are described in conjunction with proper equipment.

A handy reference table showing the relation of heat treat furnace equipment to the consecutive steps in production of small caliber ammunition is presented. For copies write direct to Surface Combustion Corp., Toledo 1.

Records Protected From Fire

An eight-page folder pointing up the pitfalls of inadequate record protection has been issued by Remington Rand Inc. Titled "The Cost Of Burned Records", the folder leads off with some percentages of the fate of businesses whose records have gone up in smoke. For example, 43 per cent of companies so affected go out of business.

Emphasized also is the shaky position in which firms find themselves when they try to collect fire insurance and accounts receivable or to resist unjust claims. Government is also shown to take a dim view of the fire alibi when asking a company to produce its records. Bulletin SC 707 may be secured from Management Controls Division, 315 Fourth Ave., New York 10.

Felt Selection Discussed

A simplified method for selection of the right grade and weight of vibration mounting felt has been developed by American Felt Co. and is described in a new booklet prepared for industry entitled "How to Reduce Vibration".

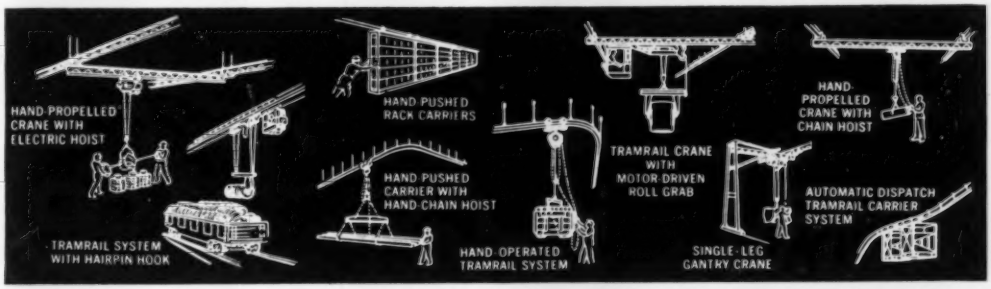
It points out that when a machine is properly mounted on Vibra-Mount felt, it rests on a resilient cushion which substantially reduces the amount of vibration transmitted to the floor.

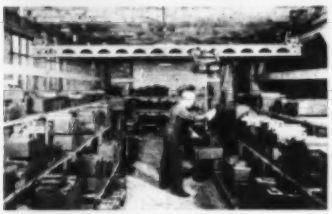
Typical of the many machines that can be isolated and protected by mounting felts are buffers, grinders, lathes, drill presses, looms, pickers, cards and hosiery machines. Copies may be obtained by simply writing to the company, Glenville, Conn.

CLEVELAND TRAMRAIL

THE OVERHEAD TRACK
TO LOWER PRODUCTION COSTS

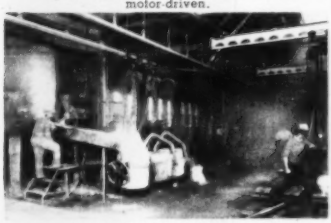
CLEVELAND TRAMRAIL SERVES EVERY INDUSTRY


HAND-PROPELLED CRANE WITH ELECTRIC HOIST
HAND-PUSHED RACK CARRIERS
HAND-PUSHED CARRIER WITH HAND-CHAIN HOIST
TRAMRAIL CRANE WITH MOTOR-DRIVEN ROLL GRAB
HAND-PROPELLED CRANE WITH CHAIN HOIST
AUTOMATIC DISPATCH TRAMRAIL CARRIER SYSTEM
TRAMRAIL SYSTEM WITH HAIRPIN HOOK
HAND-OPERATED TRAMRAIL SYSTEM
SINGLE-LEG GANTRY CRANE



Simple hand-pushed cranes with electric hoists handle heavy loads quickly and easily.

5 tons (4545 kg.) steel sheets easily handled by one man. Hoist and carrier travel motor-driven.



Over 1,000 foundries have Cleveland Tramrail and are making big savings.

TRIED AND PROVEN COST-CUTTING EQUIPMENT

The variety of ways in which Cleveland Tramrail is serving industry is amazing. It delivers materials from storage or car or truck, directly to point of work without rehandling—transports delicate, fragile wares without damage—moves hot molten metals safely—carries materials between distant points on the same or different floors or buildings. It speeds production, improves plant efficiency and cuts costs. Regardless of size or type, most installations pay for themselves in one year and keep on paying goodly dividends year after year thereafter.

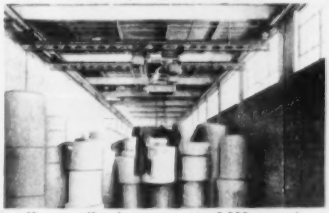
STANDARD ITEMS EASILY COMBINED TO HANDLE MATERIALS OF ANY KIND

Cleveland Tramrail consists of track, switches, carriers, cranes, hoists, grabs, etc., which can be combined in a thousand-fold ways to serve nearly every need. Equipment can be made in all variations from simple hand or electric floor-operated, to cab controlled and automatic plant-wide systems.

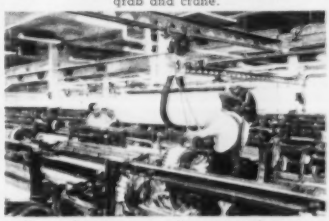
35,000 INSTALLATIONS

Over 7,500 customers have purchased 35,000 installations of Cleveland Tramrail and many of these are still in continuous operation after 25 or more years of service.

10-ton (9090 kg.) transfer bridge system handles giant airplanes. Cleveland Tramrail serves many large aircraft plants.



Heavy rolls of paper up to 6,000 pounds (2727 kg.) are handled with this motorized grab and crane.



Heavy beams are easily conveyed overhead in textile weave rooms with simple inexpensive Tramrail cranes.

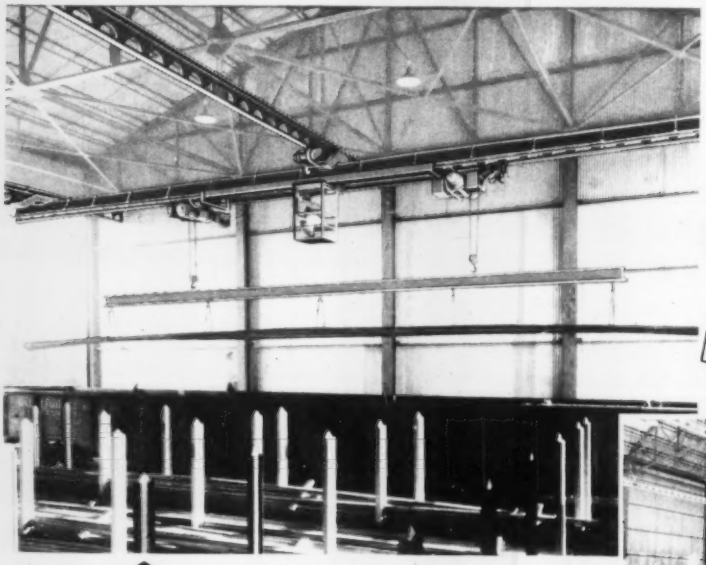
GET THIS BOOK!

Write for a free copy of Book 2008. Packed with valuable information, this well-illustrated book starts you thinking of ways you can step up production and lower costs in your plant.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO
7292 EAST 284th STREET • WICKLIFFE, OHIO

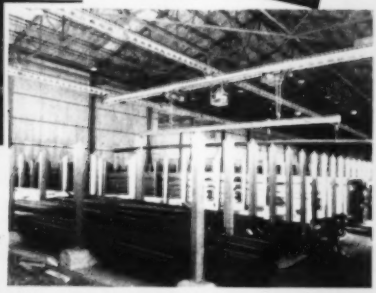
CLEVELAND TRAMRAIL

THE OVERHEAD TRACK TO LOWER PRODUCTION COSTS



Handling bundles of reinforcing rod 65'0" long from gondola car to storage with cab-operated 5 ton Cleveland Tramrail bridge.

The rod is quickly and easily handled by the overhead bridge in and out of this efficient storage area designed by Southern States Steel Corporation engineers.



UNLOADS RAILROAD CARS IN 5% TIME FORMERLY REQUIRED

CONCRETE reinforcing rods are handled out of railroad cars at the modern plant of the Southern States Steel Corporation, Dallas, Texas, to storage by a Cleveland Tramrail cab-operated transfer bridge in one-twentieth of the time required by hand methods. Thus only three man-hours are now required to unload a car, whereas it formerly took 64 to 96 man-hours to do the job.

Not only is time saved in unloading the incoming rod, but equally large time savings are made in delivering rod from storage to cut-off machines and in loading shaped rods onto outgoing trucks.

The bridge which travels on a 3-track runway is completely motorized, cab-operated and of 5 tons capacity. It interlocks with 4 spur tracks at the cut-off machines where bundles of rod are lowered onto roller conveyors serving the machines.

The two hoists have a lift of 24 feet and are located on the bridge with the cab between. Rod up to 65'-0" long is handled by use of a lifting beam.

GET THIS BOOK!

Write for a free copy of Book 2008. Packed with valuable information, this well-illustrated book starts you thinking of ways you can step up production and lower costs in your plant.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO
7892 EAST 284th STREET • WICKLIFFE, OHIO

"Jet Spray" Cooling Technique

A new "jet spray" cooling technique that will make possible electric transformers as much as one-third lighter than present units has been developed by Westinghouse engineers.

The new development may mean more power from lighter transformers, according to J. H. Chiles, engineering manager of the Westinghouse transformer division. The first experimental unit, he said, delivered some 350 per cent more power than its normal capacity because the new "vaporization cooling" dissipated 10 times more heat. A vaporization-cooled unit now is being designed for installation on the system of the Consolidated Edison Co. of New York, he disclosed.

"What we have done," Mr. Chiles explained, "is devise a system of cooling the inner workings of big transformers using a 'jet spray' of synthetic liquid compounds known as fluorocarbons. When the liquid vaporizes, it carries away the heat of the transformer. Previously, such cooling has been achieved by immersing the transformer's core and coils

Device Reduces Stripping Time

PROTECTIVE strippable plastic coatings are peeled off B-47 rear fuselage skins at Texas Engineering & Mfg. Co., Dallas, with a time saving of about 70 per cent over the former method. The new tool was developed by L. D. Cain, an assembly mechanic, and consists of a bottle with an air intake and two antenna-like dispensing tubes. Bottle is filled with the protective coating in liquid form and the amount dispensed softens the edges of the area to be stripped just long enough to permit the stripping and then hardens to seal the remaining edges of the protective coating

Economy Tips

FOR HYDROGEN USERS

When you use hydrogen in the following amounts:

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HYDROXYACETIC ACID 70%—For bright dipping of copper, electro-polishing of stainless steel and electroless plating of nickel.

METHANOL—Source of hydrogen and carbon monoxide for an efficient reducing atmosphere in many metallurgical operations, and for cleaning of metal parts during fabrication.

Product information on these and other chemicals is available. Please write on your letterhead to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Wilmington 98, Delaware.

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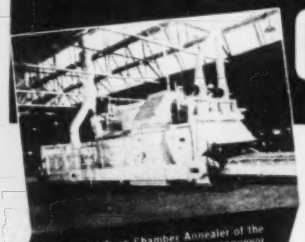
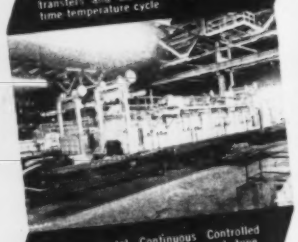
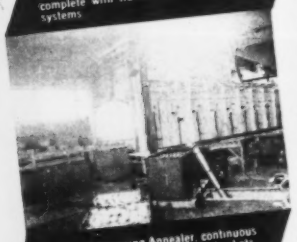


Continental Twin Chamber Annealer of the recirculating type with automatic conveyor transfers and close tolerance control for time-temperature cycle



Two Continental Continuous Controlled Atmosphere Annealers, roller rail type complete with transfer cars and conveyor systems



Continental Stamping Annealer, continuous roller rail type, complete with baskets, handling conveyors, and automatic controls for work handling and temperature cycles

Six Continental "Top Hat" Cover Type Furnaces, for bright annealing high carbon steel, complete with gas generator and automatic controlled time temperature cycling

for military production...

Whatever your heat process problems in plant conversion for military production, CONTINENTAL has the answer.

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MANUFACTURERS—ENGINEERS—CONTRACTORS FOR OVER A QUARTER OF A CENTURY

in a bath of oil or by a flow of air past the coils.

"The limit on how much power a transformer can handle has been controlled to a large extent by the heat the unit generates in operation. By doing a better job of keeping the transformer cool, we now are able to get more work from it."

The cooling method is the result of years of research and development, first under Dr. C. F. Hill at the Westinghouse research laboratories where the fluorocarbon spray was worked out, and then at the transformer division where two experimental units using the system were built and operated.

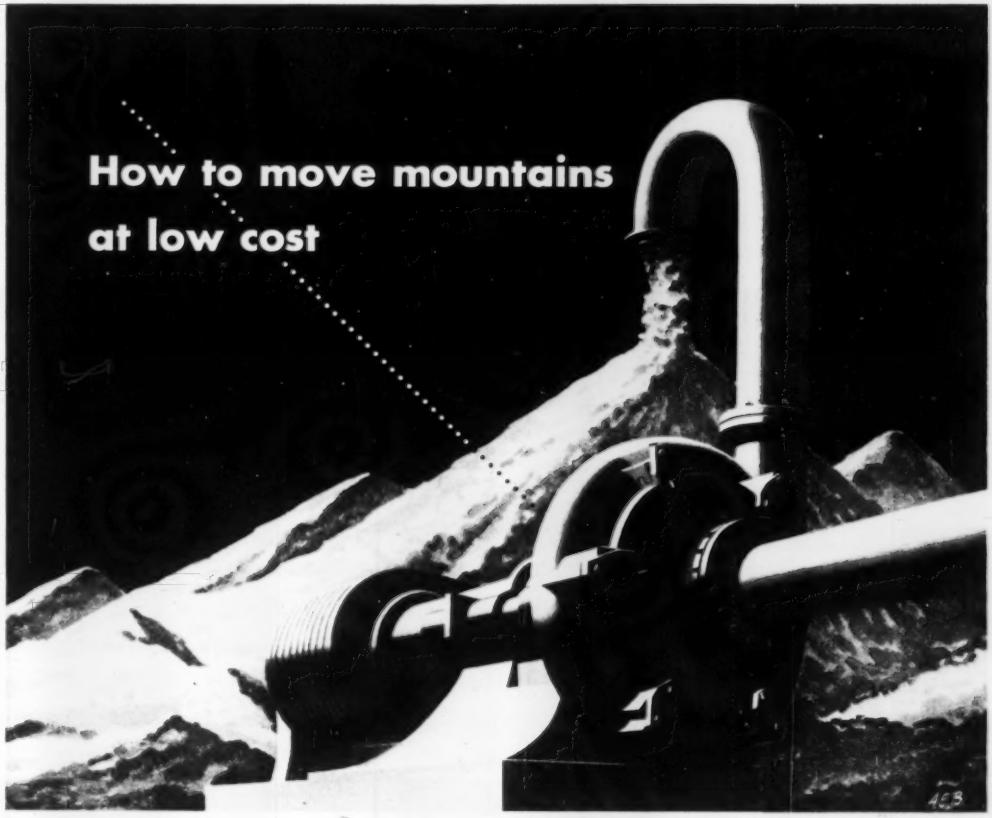
Here's the way the new cooling system works according to Dr. Paul Narbut: Instead of completely filling the transformer tank with oil, a small quantity of liquid fluorocarbon is stored in the bottom of the tank. This liquid is pumped to a nozzle that sprays it directly on the hot transformer core and coils. The heat evaporates some of the liquid. The vapors formed then circulate toward the cooling surfaces of the transformer tank where they condense and release the heat that was taken from the coils. This condensed liquid then flows back to the bottom of the tank ready to start the process all over again.

These vapors also play another important role in the new type transformer. When they fill the space inside the tank, the fluorocarbon vapors provide excellent insulation in the same way that oil insulates oil-filled transformers.

"Such a transformer will be free from danger of fire or explosion because the liquid used is fireproof," Dr. Narbut said. "In fact, it actually has fire extinguishing properties. A transformer of this type will be as small as and lighter than an equivalent liquid-immersed transformer. Because vaporization carries away heat better than circulating oil, experimental work may disclose that there is no inherent limit to the power such a transformer can be built to handle.

"Because insulating properties of fluorocarbon vapor are superior to ordinary gases, it also will be possible to build such transformers to handle higher voltages than the dry or air-cooled units can handle," he added.

Since the first of this year, the Westinghouse engineer said, a specially built, 500 kilovolt-ampere vaporization - cooled transformer has been in operation at the transformer division plant. It is being used to obtain design data.

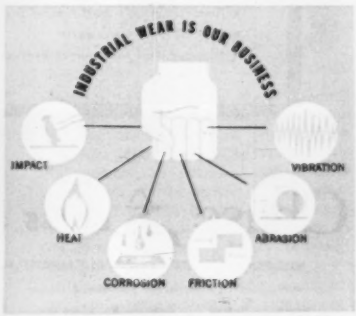


SLURRY, SAND, ASH OR GRAVEL . . . Amsco pumps lick them all

For 30 straight years, thousands of tons of coarse, abrasive ash have poured through an Amsco pump in a midwest power plant. This tough, wear-resistant unit not only has survived this severe wear but has cut handling costs by 65%. Another Amsco pump handling sharp toothed coal slurry turns out *double* the daily work, with 3 times the service life of the previous pump. Performance like this depends on good design and selection of the right metal for the job.

Amsco pumps are engineered for low-cost handling of materials. They are simple in design, extra rugged in shaft and bearings, and are adjustable to hold highest efficiency. These are features that reduce maintenance time and costs. No matter whether the conditions of wear on the job are impact, abrasion or corrosion, Amsco pumps are fitted with the metal best suited to give long life and satisfactory service.

Years of practical field engineering experience have equipped our Amsco engineers to design or recommend the pump that will solve your pumping problem. Write Department G for illustrated literature.



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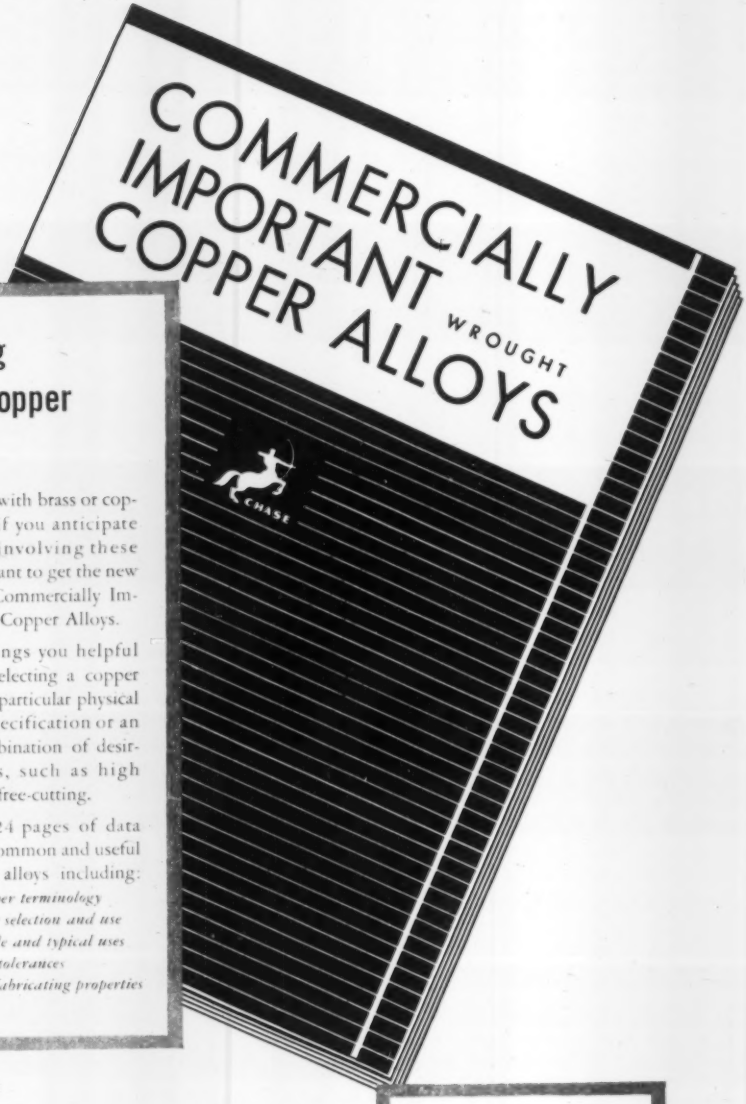

Fabricating brass or copper alloys?

If you're working with brass or copper alloys . . . or if you anticipate defense orders involving these metals . . . you'll want to get the new Chase book on Commercially Important Wrought Copper Alloys.

This book brings you helpful suggestions for selecting a copper alloy to meet any particular physical or fabrication specification or an alloy with a combination of desirable properties, such as high conductivity and free-cutting.

It contains 124 pages of data about the more common and useful wrought copper alloys including:

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Because of the expense in making this book, we must limit its distribution to those directly concerned with the fabricating of metals. Please send your request on firm letterhead, giving your position or title.

New Products and Equipment

Hollow Electrode Clears Heads

Elox Corp. of Michigan, 740 N. Rochester Rd., Clawson, Mich., is introducing its M-7 Tapmaster, developed for quick removal of broken taps, drills, reamers and studs. The tool employs an electrode which is chucked into the disintegrating head and held in place by a collet. To remove a broken tap or drill, an elec-

trode about half the diameter of the broken tool is used. A coolant pumped through the hollow electrode washes away particles of metal.

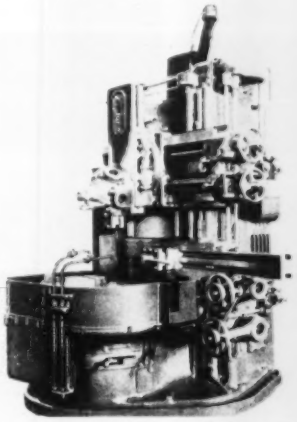
Work table clearance is 28 inches and adjustable drill head may be reversed to give 5 feet of clearance from floor. A back break adjusts for corner drilling and drilling holes at any angle up to 45 degrees. It will drill holes from 0.040-inch to 1-inch and larger in hardened dies within 0.010-inch. The unit is self-contained, with a 2 kva rating.

Check No. 1 on Reply Card for more Details

Side Head Mill Modernized

Improved Niles 42 - inch vertical boring and turning mill with side head is announced by Baldwin-Lima-Hamilton Corp., Hamilton, O. The machine is modernized by increased table speeds and corresponding feed changes; by use of antifriction bearings in table speed change gear box and table mounting; and by a higher powered drive from a 30 hp motor.

High accuracy is provided by several features of design including integrally cast column and base which give it high rigidity; a three-track cross-rail, assuring perfect alignment between cross-rail and table in all positions of the rail; and an elevating screw adjacent to the narrow guide, preventing tilting and bind-

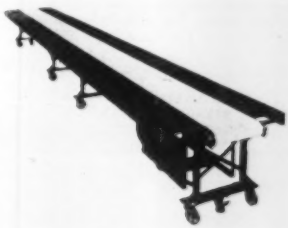


ing. Swing with side head down is 50 inches. Maximum distance from table top to turret face is 48 inches. The vertical head, which has five faces, has a slide travel of 28 inches and will swivel 45 degrees to either side of verticle position. The side head, which has four faces, has a vertical working travel of 35 inches and a horizontal travel of 21 inches. There are 12 table speeds ranging from 9 to 200 rpm and 16 feeds for either vertical or side head between 0.003 and 0.520-inch per revolution of the table.

Check No. 2 on Reply Card for more Details

Belt Conveyor Is Adjustable

Horizontal power belt conveyor for systematic handling of goods is being made by Rapids-Standard Co.

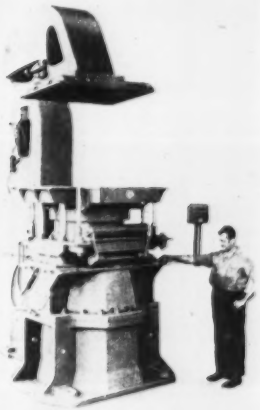


Inc., Grand Rapids 2, Mich. The conveyor, called Rapistan Table-Veyor, may be varied in length from 10 to 60 feet by adding or removing 5-foot sections. Its width is determined by choice of 10, 12, 16, 18 or 20-inch belts. Side leaves that fit on either side of the belt to increase table top working space are also available. Belting is four-ply innerbound solid woven cotton and is operated from 5 to 100 fpm at fixed or variable speed. Belt direction is one way or reversible. Conveyor height is adjustable from 21 to 40 inches and may be lagged to the floor or mounted on casters for portable use. A 1/3 hp, one or three-phase motor powers the unit.

Check No. 3 on Reply Card for more Details

Jolt-Squeeze-Strip Molder

Development of a jolt-squeeze-strip molding machine, featuring centralized control of all operations, for production of massive copes and drags of uniform standard is reported by Spo Inc., 6494 Grand Division Ave., Cleveland 25, O. The molder has a



squeeze capacity of 80,000 pounds and jolt capacity of 4000 pounds operating on standard 80 psi. Squeeze cylinder diameter is 36 inches; pattern draw 14 inches; and squeeze piston stroke 14 inches. Flask space ranges from 38 inches to 54 inches maximum, left to right, and from 32 to 50 inches, front to back. Its designation is model 2364.

Squeeze head is power operated; jolt cycle timer controlled; and squeeze cycle regulated by a pressure switch. Two-speed vibrating and stripping operations are automatically controlled to eliminate dependence on the operator's judgment. Two hardened and ground bushings in each stripping yoke operate over two ground and hard-chrome plated guide pins. Stripping mechanism is separated from the

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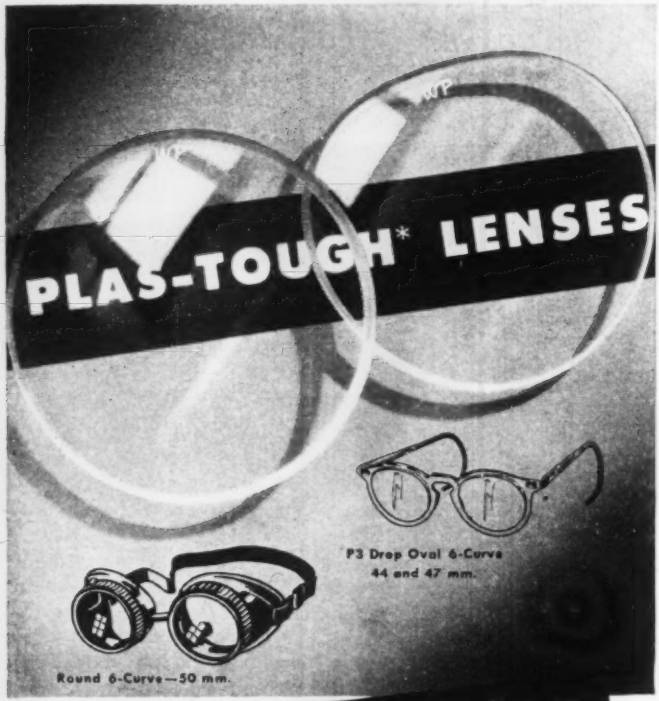

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Dependable Products Since 1870

jolt unit. The machine is designed to recess 50 inches below floor level and extends 116 inches above. All servicing can be done at or above floor level.

Check No. 4 on Reply Card for more Details

Compression Transfer Molder

Combination compression and transfer molding press weighing 1000 tons made by Elmes Engineering Division, American Steel Foundries, Cincinnati 29, O., can be changed from straight compression to transfer molding by turning of a switch. The unit is designed for a hazardous location, has

two pushbutton control panels—one near the press (see cut) and another in a separate room—to provide complete remote control.

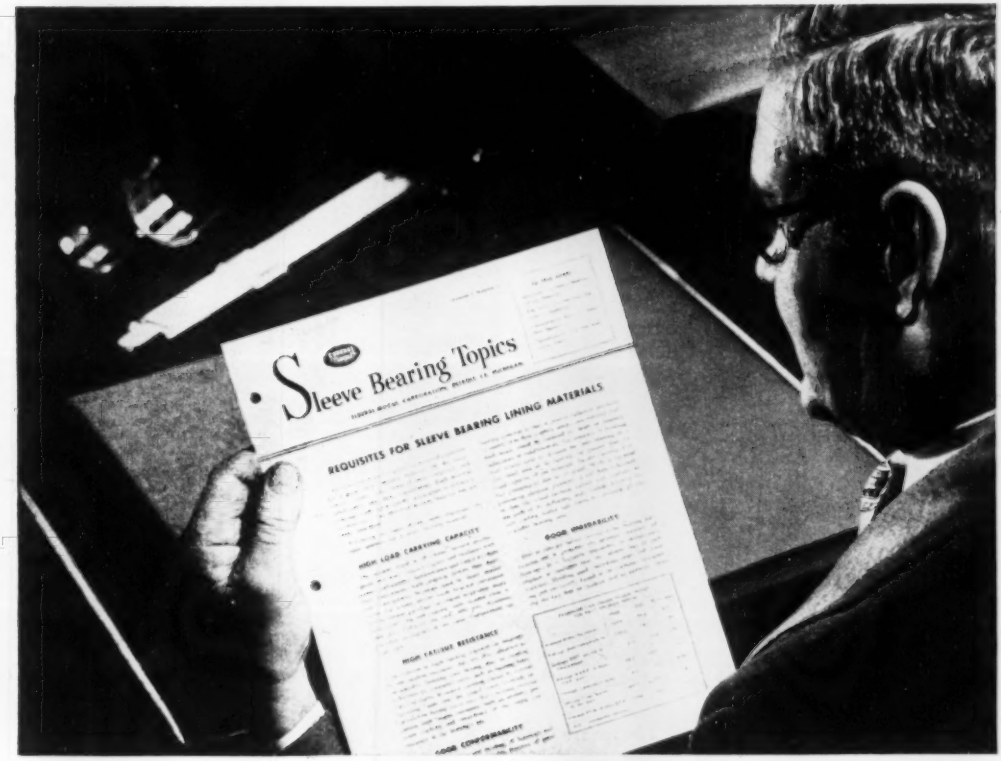
In the compression cycle, circuit is arranged to provide two breathe periods. Opening during breathing is controlled to ¼-inch. Curing cycle is set by a motor-type timer furnished with any required range. Pump is equipped with compensating control to assure use of only essential minimum horsepower during curing cycle. Lower knockout is operated hydraulically and is fully automatic.

Check No. 5 on Reply Card for more Details

Grinder Series Improved

An improved series of universal tool and cutter grinders is being introduced by the K. O. Lee Co., Aberdeen, S. D. Included are four models: B800 a basic tool and cutter grinded; B860 universal tool grinder equipped with slide mounted multiple speed head; B803 chip breaker grinder; and B804 universal carbide tool grinder.

Swing over table is 8¼ inches (with 1 inch raising blocks it is 10¼ inches). Distance between centers of head and tail stocks is 8¾ inches



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Here's a quick, convenient way for the designer, engineer and draftsman to keep up-to-date on developments in materials, design and applications of sleeve bearings, bushings and similar precision parts. The latest news on improved cast and sintered copper-leads . . . the new bi-metal rolled, split-type bearings . . . the re-design problems involved when shortages call for bearing lining changes . . .

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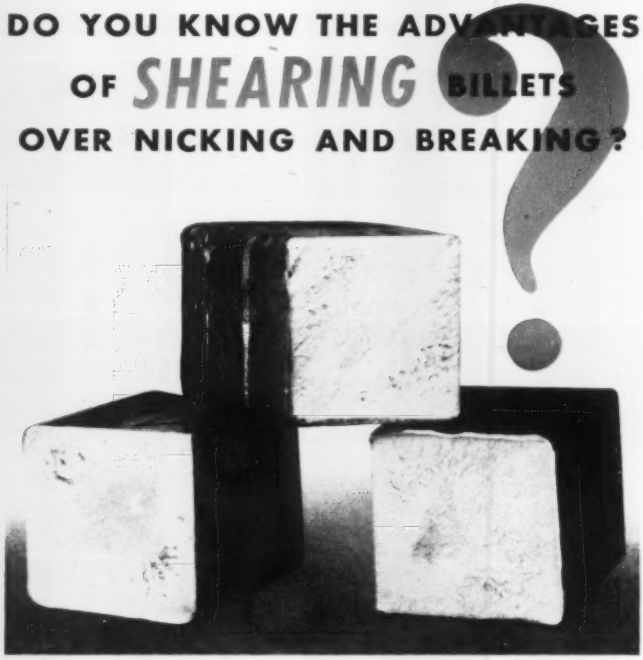
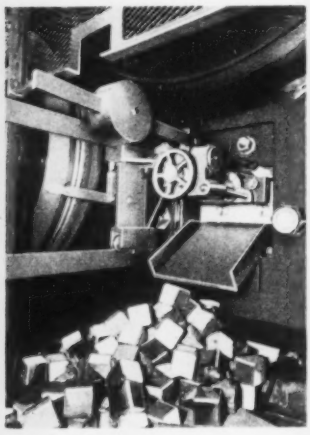
DO YOU KNOW THE ADVANTAGES OF *SHEARING* BILLETS OVER NICKING AND BREAKING?



- High cutting speeds
- Clean, square cuts
- Uniform, sheared pieces



Above are sections of 4½-inch alloy steel billet cut by a "Buffalo" Billet Shear, showing the clean, square cuts produced. There is no "smearing" of the metal, or "notches" on one edge, as in nicking and breaking. "Pipes" in the billet could be easily detected. Sheared pieces are kept to uniform weight, and there is no expense for gas and burner. Best of all, these pieces are cut at the rate of 10 per minute! "Buffalo" Billet Shears are built in sizes to handle up to 10-inch rounds and 9-inch squares. HUNDREDS are in use! WRITE FOR BULLETIN 3295-A, for facts on lower cost shearing of billets.

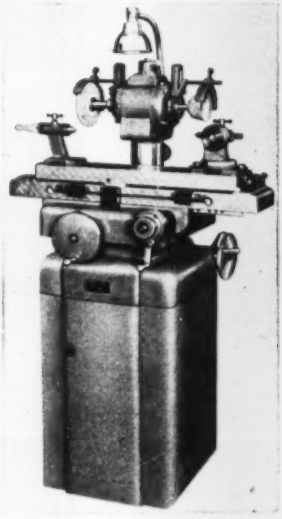
BUFFALO "Buffalo" FORGE COMPANY

158 Mortimer St. Buffalo, New York
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING CUTTING SHEARING BENDING

and table working surface is 5¼ x 25¼ inches. Maximum height of machine with column extended is 56¼ inches and column diameter is 4 inches.

Verticle movement of the column



is 6 3/4 inches, 0.040-inch per revolution of the handwheel. Grinding wheels' maximum diameter is 6 inches with a 5/8-inch wheel bore diameter.

Check No. 6 on Reply Card for more Details

Tailored Parts Assembly

Erectosembly work stations designed to provide maximum efficiency for assembly line operations are a development of Coleman-Pettersen Corp., 2152 St. Clair Ave., Cleveland 14, O. Work stations can accommodate various types of large and small assemblies and eliminate the need for bins and tables behind assembly lines. Parts can be loaded from rear of work stations providing a constant supply of components for the operator.

Work stations incorporate two main components: Large flat wire baskets for the accessible storage of fabricated parts and subassemblies and plastic cups placed on both sides of a revolving frame to contain screws, nuts and small parts. Baskets can be furnished in a variety of sizes and shapes and can be moved to meet production demands. Variations on the work station setup can be obtained by bolting the baskets and cups to the adjustable frame, which supports them behind the actual work area. Components are

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with TOCCO* Induction Heating

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50 kw 10,000 cycle TOCCO machine heating bolt blanks

Why not have a TOCCO engineer find out how TOCCO can help reduce *your* forging, brazing, melting or hardening costs—no obligation.

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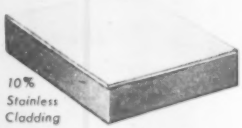

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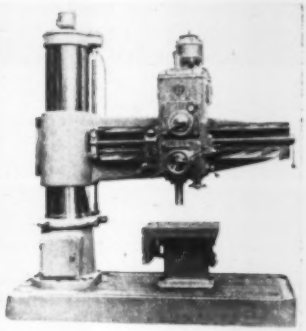
adaptable to one station or a line of stations with variable combinations along the entire assembly line.

Check No. 7 on Reply Card for more Details

Broad Drill Line

Cosa Corp., 405 Lexington Ave., New York 17, N. Y., is introducing the Kolb line of light, medium and heavy drills to the U. S. market. The machines are built with hardened and ground gears sliding on hardened and ground spline shafts rotating on ball bearings. Time saving features include an electro-hydraulic clamping



system for rigid locking (automatically or by hand) of column and spindle head, pushbutton controls and speed selector. A device for preselection of feeds for a sequence of rough and finish drilling, reaming and tapping operations is optional.

Capacities for drilling cast iron range from 1⅜ to 8 inches in diameter; maximum drilling radii range from 27 to 180 inches. Column diameters are from 7½ to 35 inches. Model NKR53 (see cut) has 12 speeds from 30 to 1500 rpm; and 12 feeds from 0.003 to 0.118-inch per revolution.

Check No. 8 on Reply Card for more Details

Arc Control Speeds Adjustment

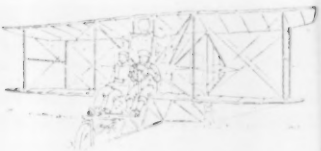
Arc drive control designed to produce electrical transient characteristics desirable for certain welding operations, is manufactured on type RA selenium rectifier welders by Westinghouse Electric Corp., Pittsburgh 30, Pa. Arc drive permits adjustment of arc characteristic to suit a particular job. The device operates automatically and instantaneously to provide an extra surge of welding current the moment the arc is shorted. Violent and prolonged overshoots and undershoots of welding current are eliminated.

The arc drive circuit consists of a three-phase, full-wave rectifier ener-

Flying Forgings-

THE MODERN AIRPLANE IS LARGELY MADE UP OF HAMMERED METAL PARTS

IT is hard to associate flight through the air, —the flight of birds, the flight of planes— with weight, strain, stress, impact; yet the greater the size of the plane, the higher the speed, the heavier the load, the greater become the forces tending to pull it apart. That is why the toughness and strength of the metal parts that make up the modern plane are so important, why drop forgings and hammered sheet metal parts are essential in airplane construction—why the hammers built by Chambersburg are busy night and day in the aircraft industry, as in all other manufacturing industries which use metal parts that must not fail.



THERE WERE FEW FORGINGS IN THE BAMBOO-AND-VARNISHED-LINEN AIRPLANE OF 1911 BUT EVEN THEN THE PRIMITIVE AIRPLANE ENGINE HAD THEM

The original Wright plane that went into production—the Model B—had a high speed of 42 m.p.h., carried 2 people, had a little over 2 hours gasoline supply and a service ceiling at full load of about 8000 feet.

Today's plane—40 years later—has a high speed of 600 m.p.h., carries 125 passengers, has enormous gas capacity and ceilings up to 50,000 feet.

Tomorrow's plane, says Grover A. Loening, may cruise at 1200 to 1500 m.p.h. (N.Y. to Europe in 3 hours, California in 2 hours, Florida in 45 minutes) may land almost vertically and may be fireproof in crashes. And it, too, will be built largely of hammered metal parts.

CHAMBERSBURG ENGINEERING CO. CHAMBERSBURG, PA.

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THE HAMMER BUILDERS

Let's go...let's get that SCRAP in!

All your SCRAP is urgently needed, NOW

THE scrap shortage is serious. *Your* scrap—every pound of iron and steel scrap you can locate in your plant or factory—is vitally needed and needed right away. For unless you do everything possible to get this scrap on its way to the mills, steel production is bound to slow up. That can't be allowed to happen. But without your help it surely will.

It takes at least one-half ton of scrap to make one ton of steel. With the mills turning out more than 2 million tons of steel per week, over 1400 carloads of industrial scrap are needed *every day*. And industry, somehow, must provide it.

What you can do to meet this emergency

First, organize a permanent Scrap Salvage Committee and make the "drive-for-scrap" part of your daily operations. Search out every possible source of scrap. Turn your old and worn-out equipment, tools and machinery over to your scrap dealer, at once. Dig out your discarded dies, rusted-out tanks and boilers, your old rails and other miscellaneous junk, and start them back to the mills through your scrap dealer. Encourage every employee to report every retired or obsolete machine that now stands idle—see that it is turned in for scrap.

By getting this "dormant" scrap off your premises and into the furnaces you'll be helping not only yourself but America as well. *More* scrap turned in, means *more* steel turned out—it's as simple as that. So let's get going.

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

USS

1-1329

This page would ordinarily be used to tell you about

NATIONAL SEAMLESS PIPE AND TUBES

but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
(Tubing Specialties Division)
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

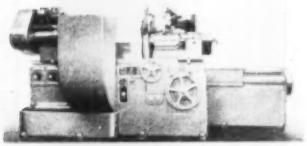
gized by tertiary windings on the main welder transformer, a Thermoguard and a control rheostat. Output voltage is approximately 16 v dc. Amount of drive desired can be set by the operator, but adjustment of the control is not critical. It has an

off position for use when the machine is short-circuited on low resistance loads for any length of time. A self-heating thermostat in the arc drive circuit protects it from overheating due to sustained short-circuit of the welding terminals.

Check No. 9 on Reply Card for more Details

Grinder Has Greater Swing

An aircraft strut grinder built by Norton Co., Worcester 6, Mass., provides capacities for grinding large airplane landing gear components that are not accommodated in standard sizes of cylindrical grinders because of irregular shape and large



swing. The machine is arranged for a 26 or 32-inch diameter swing over the table and is available in work length capacities of 72 and 96 inches.

It offers a swing capacity of 80 or 86 inches by means of a gap which is adjustable in width by moving a pedestal on which the headstock rests. Through the pedestal, the gap may be set to any width up to 26½ inches. The grinder is of the traveling wheel head type, with wheel head travel control provided by adjustable dogs on a large wheel placed on the front of the machine. A swivel table permits grinding of tapers. An auxil-

SURE CURE FOR DOUBLE TROUBLE

Oxy-acetylene welding is a lot safer and faster today because of a unique hose called Twin-Weld.* Invented and patented* by Hewitt-Robins, it does away with the dangerous tangle of individual oxygen and acetylene lines that formerly plagued welders.

Twin-Weld combines both hoses in one compact, molded unit . . . neat, flexible, non-kinking . . . yet readily separates for coupling to tanks and torch. It saves time in getting welding equipment into operation, makes it easy to reach the work, change position at will or work in close quarters on difficult jobs.

Making better industrial hose and belting has been a habit at Hewitt-Robins for almost a century. Twin-Weld is only one of many Hewitt-Robins "firsts" that have made the handling of fluid and solid bulk materials faster, more dependable, more efficient, more economical.

If you want the benefit of an international experience in solving your materials handling problem . . . whether in hose, belting, vibrating machinery or complete belt conveyor systems . . . get in touch with Hewitt-Robins.

*U. S. Patents 2,122,355 & 2,136,220

HEWITT HR ROBINS

Executive Offices: 370 Lexington Avenue, New York 17, N. Y.

HEWITT RUBBER DIVISION: Belting, hose and other industrial rubber products
ROBINS CONVEYORS DIVISION: Conveying, screening, sizing, processing and dewatering machinery
ROBINS ENGINEERS DIVISION: Designing and engineering of materials handling systems

Hewitt-Robins is participating in the management and financing of Kentucky Synthetic Rubber Corporation

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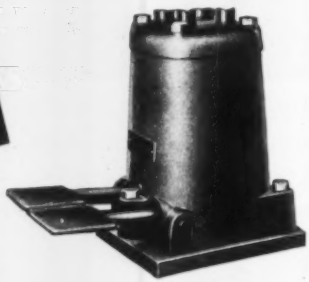
AIR AND HYDRAULIC
Control Valves



No. 3401-R-4
½ Inch 4-Way
Foot Valve

FOOT OPERATED Air Valves

Increase output of hammers, shears, presses, etc.

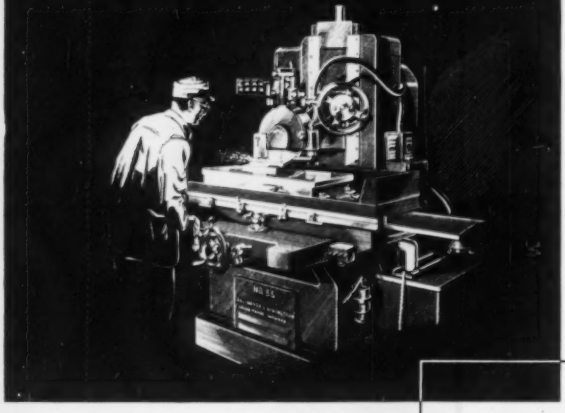
● Operators have both hands free to handle the work—speeding production. Valving mechanism has stainless steel body and push-pull rods, brass sleeves, self-sealing U-packers and many other refinements, all fully enclosed against dirt, assuring long efficient trouble-free operation. Convenient pipe connections. No metal to metal seating. ⅜" to 1" sizes, 3-way and 4-way, neutral position and regular actions. *Write for full details.*

Quick-As-Wink
AIR AND HYDRAULIC
Control Valves

Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1927 East Pershing St., Salem, Ohio

WHEN THE DECISION IS PRECISION...



Where extreme tolerances are not required, the choice of any particular grinding machine may not be too important. But, where absolute precision is demanded, the choice is usually *Grand Rapids.*

Defense orders make it impossible to fill orders as quickly as we desire—but we know our customers can appreciate the reasons for delay. As always we'll do our best to serve you.

GALLMEYER & LIVINGSTON CO.
307 Straight Ave., Grand Rapids, Mich.

Grand Rapids Grinders
—World's finest

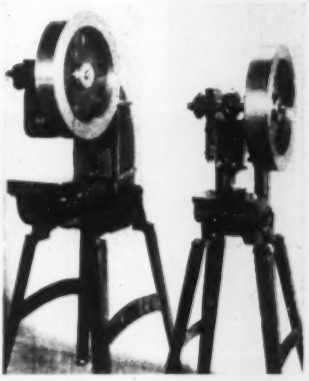
GALLMEYER & LIVINGSTON

iary spindle for use on parts with projections is available at extra cost.

Check No. 10 on Reply Card for more Details

Variable Speed Punch Press

Two 5-ton variable speed punch presses, in standard and 4-in-1 models, with ram speeds suitable for deep drawing, piercing and blanking operations are being introduced by Kenco Mfg. Co., 5211 Anaheim-Telegraph Rd., Los Angeles 22, Calif. Momentum needed for slow speed operation is supplied by an 18-inch diameter, 110-pound flywheel while ram



speeds can be varied from 95 to 280 strokes per minute by adjusting the ¾ to 2½-inch diameter of the variable speed motor pulley.

Flywheel and variable speed drive are interchangeable with the company's standard or 4-in-1, 4-ton presses. Other features include a one-piece, 1⅛-inch crankshaft; 1-inch diameter clutch drive dog built into the clutch collar instead of milling the crankshaft; extra-large v-type ram guides and over-size ram area; adjustable motor bracket and brake. The 4-in-1 model has facility for switching instantly from single to repeat operation without stopping the motor; an adjustable bed that permits conversion to long, half or horn-type punch press; and a deep 12¾-inch throat that permits punching to the center of a 24½-inch circle.

Check No. 11 on Reply Card for more Details

Ratchet Is Basis for Binder

A hoist binder on the ratchet hoist principle has been introduced by Coffing Hoist Co., Danville, Ill. The binder will take up any amount up to its full 20½ inches—or more if a longer chain is desired—and is useful in springy loads where the binding chain or cable must be tightened by force through considerable dis-

tance. Its operation is controlled entirely by the handle, since no buttons, levers or locking devices are incorporated.

Loads settling in transit can be further tightened without first releasing to take a new grab. A safety feature of its design prevents the handle from flying up under pressure. The binder weighs 10 pounds and exerts a pull of 3000 pounds.

Check No. 12 on Reply Card for more Details

Double Faced V-Belting

Leather link construction double faced V-belting is available from Graton & Knight Co., Worcester 4, Mass. Each link consists of two fiber sections faced with oak-tanned leather. Steel connectors insure flexibility and eliminate stretch. Leather segments are V-faced to provide a double bevel that conforms to standard V-belt sheaves.

Check No. 13 on Reply Card for more Details

Emulsion Cleaner

Super-Mul, a high strength, active solvent emulsion cleaner designed for the removal of industrial soils in spray washing machines, is announced by Du Bois Co., Cincinnati 3, O. It cleans thoroughly, rinses freely, resists hard water, does not sludge out with heavy soil loads. It does not attack metals and painted surfaces and will not deteriorate machinery or equipment.

Check No. 14 on Reply Card for more Details

Electrode for Chrome Moly Steel

EutecTrode 70, a chrome and nickel content electrode is announced by Eutectic Welding Alloys Corp., Flushing, N. Y., for repair and maintenance work of chrome-molybdenum steel. The special composition of this welding alloy coupled with the FrigidArc coating results in easy application in all positions and a smooth arc action. Electrode is made in $\frac{1}{16}$, $\frac{5}{64}$, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{5}{32}$ and $\frac{3}{16}$-inch diameters.

Check No. 15 on Reply Card for more Details

Tumbling Compound

Tumb-L-Magic, an improved wet-process tumbling compound for ferrous metals, is a new addition to the line of Tumb-L-Matic Inc., New York 70, N. Y. The cleaner acts to suspend grease and cuttings in the solution.

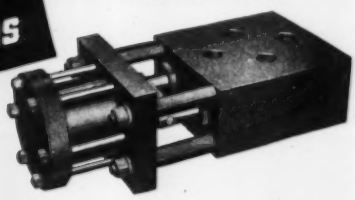
Check No. 16 on Reply Card for more Details

Plastic Lens for Goggles

Known as Plas-Tough, a new 6-curve plano plastic lens for industrial safety glasses is introduced by Willson Products Inc., Reading, Pa.

Quick-As-Wink
AIR AND HYDRAULIC
Control Valves

¾ inch 4-Way — 5000 p.s.i. Piloted Hydraulic Valve



***PILOT OPERATED* Hydraulic Valve**

For hydraulic systems to 5000 p.s.i.

● Designed for controlling double acting hydraulic cylinders. The pilot cylinder is controlled by any type of 4-way air valve and is operated either automatically or manually from a convenient control station. Machined steel housing, hard chrome plated ground and polished stainless steel plungers, molded packers sealed by valve pressure. All parts readily accessible without disturbing the piping. ½" to 4" sizes. *Write for full details.*

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Control Valves

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Mfd. by C. B. HUNT & SON, INC., 1924 East Pershing St., Salem, Ohio

Need strapping for defense orders?

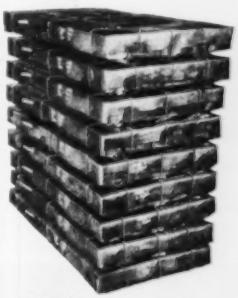
Perhaps we can help!

Gerrard Round Steel Strapping complies with JAN-P-106A and JAN-P-108

● A Gerrard engineer will gladly give you all possible help with your defense packaging problems. Frequently, he can show you how to get more use out of your steel strapping by bundling, palletizing or using the Diagonal Tie. You can depend on his advise . . . and on the strength of Gerrard Round Steel Strapping. It complies fully with the joint Army-Navy specifications JAN-P-106A and JAN-P-108 for overseas packing.

Strapping for defense receives preference in delivery according to current regulations. Strapping available for non-defense uses is being equitably distributed among our customers.

Gerrard Steel Strapping Company
4745 S. Richmond St., Chicago 32, Ill.



Steel sheets are securely Gerrard-strapped for export. Round strapping permits bundles to slide over each other without tearing the straps.

USS **GERRARD ROUND STEEL STRAPPING**

UNITED STATES STEEL

Sperry

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SAVES TIME
MATERIAL
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WRITE FOR BOOKLET TODAY

PUT SOUND TO WORK

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INTERNAL FLAWS
IN METALS
at Low Cost

Ultrasonic vibrations penetrate up to 30 feet to "see" internal defects and fatigue cracks in primary metals and finished metal parts. TEST NEW MATERIAL at the mill to improve quality and customer acceptance. TEST METALS PRIOR TO PROCESSING, MACHINING AND FABRICATING to avoid wasted time and man-hours resulting from faulty materials. QUALITY CONTROL of work in process. MAINTENANCE INSPECTION to detect fatigue fractures. MEASURE PHYSICAL DIMENSIONS. You can detect internal flaws more effectively at lower cost with a Reflectoscope . . . for sale, for rent, for lease. Inquire today. Protect and improve your reputation for products of fine quality—eliminate service failures.

SPERRY Products, Inc.
Danbury, Connecticut

MANUFACTURERS OF
METAL TESTING EQUIPMENT
HYDRAULIC CONTROLS
SELF-SEALING COUPLINGS
LITERATURE ON REQUEST

Made of a newly developed plastic with an improved surface hardness, lens resist scratches, abrasions and common industrial acids. Lenses are available in drop-oval shape, in 44 and 47 mm sizes and 50 mm round.

Check No. 17 on Reply Card for more Details

Vise for Grinding Angles

With the universal vise offered by Combination Vise & Jig Co., Orfordville, Wis., any compound angle can be ground without guesswork and without the use of angle parallels. Vise consists of a base on which a rocker is fitted; a sub-base fits on top of the first rocker; on top of sub-base rests another rocker. A tool holder that can take tools up to 1½ inches wide is on top of the last rocker. All rockers are graduated.

Check No. 18 on Reply Card for more Details

High Strength Plastic Rods

High strength plastic rod in fractional sizes is announced by Dynakon Corp., Cleveland 3, O. It is molded of Dynakon-F, a high tensile strength material with a tensile strength of 100,000 psi. Rod is resistant to acid and mild alkalies, salts and most organic solvents.

Check No. 19 on Reply Card for more Details

Alkaline Etching Compound

Diversey Corp., Chicago, Ill., offers Aluminux, a new type of alkaline etching compound for all aluminum alloys. It assures uniform etched surface with a diffused reflection and an even appearance. It also eliminates cement-like scale formations on tank and coils.

Check No. 20 on Reply Card for more Details

Collapsible Pocket Magnet

Boyd Electronics, Detroit 1, Mich., has developed a powerful collapsible pocket magnet with flexible extension. The pen-sized magnet is helpful for cleaning blind drill and tap holes or recovering nuts and bolts in assembly work. Its magnetic power will pass any coated surface.

Check No. 21 on Reply Card for more Details

Conveyor Belt Cleaner

S-A spring type conveyor belt cleaner, offered by Stephens-Adamson Mfg. Co., Aurora, Ill., has self-aligned, spring steel wiper blades that are set perpendicular to the belt surface, but diagonal to belt travel, to wipe belt clean and dry as it passes. Spring arms supporting the blades maintain a uniform pressure on the belt and allow blades to ride easily over obstructions such as belt splices. Dribble from the cleaner falls directly into the rear of the discharge chute at the head end of the conveyor.

Check No. 22 on Reply Card for more Details

Expansive Bit

An expansive bit, featuring a one-piece shank, is available from Robert H. Clark Co., Beverly Hills, Calif. It cuts clean holes in hard or soft wood from ½ to 3 inches in diameter. The tool steel blades are easily adjusted and the positive lock prevents blade slippage.

Check No. 23 on Reply Card for more Details

Drill Pipe

Spang-Chalfant Division, National Supply Co., Pittsburgh, Pa., announces drill pipe on which a welded connection is employed between tool joint and upset ends of the drill pipe. Every type and size of joint now in common use as well as many different combinations of joint and pipe outside diameters that cannot be furnished when screwed connections are used are available. Hard-faced tool joints are optional in standard sizes.

Check No. 24 on Reply Card for more Details

Universal Tool Holder

Dimco, a universal tool holder for quick and accurate clamping on the lathe, is introduced by Kelvin Systems Corp., S. Norwalk, Conn. It is designed to fit any engine lathe for production runs. Holder consists of a main center section that is fixed in position on the compound and may be rotated through 360 degrees for a setup for any series of operations. Once center section of tool post is placed for operation, there are three possible positions for any of the tool setups.

Check No. 25 on Reply Card for more Details

Single Twist Bits

A new line of single twist bits (ship augers) is announced by Midway Tool Co. Inc., Melvin, O. They are available in nine sizes from 8/16 to 16/16-inch. Bits are manufactured with hand brace shanks or square shanks for bar handles. They are also furnished with spur or spurless heads, with or without screw tips.

Check No. 26 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

74. Metal Cleaning

Oakite Products, Inc.—Materials, equipment and procedures for removing soils resulting from metal heat-treating, forging, rolling, stamping, drawing and extruding process are covered in 44-page illustrated booklet, "Some Good Things to Know About Metal Cleaning." Machine cleaning, electrocleaning, prepaint treatment and barrel cleaning are few of many methods described.

75. Excavators

Marion Power Shovel Co.—32-page booklet No. 403 lists specifications and types of service to which All-Purpose excavators can be converted for use as shovels, draglines, clamshells, cranes, backhoes, pile drivers or coal loader.

76. Electrical Connector

Albert & J. M. Anderson Mfg. Co.—8-page illustrated catalog 49B contains dimensional, price and general rating data for Eitherend electrical connectors. Although each tubular half connector is identically formed, any two half units, within respective sizes available, can be connected. Applications are described.

77. Quench Oil Cooler

Trane Co.—Systems which metal-working plants can use to increase quality and quantity production in heat treating are outlined in bulletin D-350-2 on evaporative cooling of quench oils. Included are suggestions for control of quench oil cooling systems, and selection, capacity and dimension data.

78. Diamond Abrasive

Elgin National Watch Co.—Specific performance and application advantages of Dymo-C diamond abrasive for lapping and polishing carbide drawing and heading dies is detailed in 4-page folder No. 5000651. It also contains complete catalog and price data.

79. Cutting Tool Materials

Allegheny Ludlum Steel Corp.—36-page illustrated guide book "Cutting Tool Materials" deals with analyses, comparison and application of high speed steels, cast alloys and cemented carbides. Effect of various alloying elements and materials on cutting tools is shown. Also covered are available forms, sizes, manufacturing processes, cost considerations and conditions of use.

80. Metal Polishing

Norton Co.—"Setting-up Metal Polishing Wheels and Belts" is explained in 44-page illustrated pocket-size manual of the same title. Sections cover physical properties of abrasive grains, preparation of glue, types of polishing wheels, setting them up, bonding agents, drying, setting up belts and polishing different metals.

81. Air Cylinders

Rivett Lathe & Grinder Inc.—Twenty-eight different models of air cylinders, each in nine bore diameters, are illustrated and described in catalog section No. 55. Working drawings and specifications are furnished for each model and size.

82. Pressure Transmitters

Automatic Temperature Control Co.—Application data, operation, available ranges, wiring and case diagrams are covered in four 2-page data sheets on Bourdon tube pressure transmitter, 15 to 10,000 psi; gauge pressure bellows transmitter, 0-10 to 0-200 in. of water; absolute pressure transmitter, 0-50 to 0-30 in. of mercury; and differential pressure cell, 0-20 to 0-300 in. of water.

83. Relays & Controls

Assembly Products, Inc.—35-page illustrated catalog No. 1-A lists sizes, ranges and prices of Simplytrol contact meter-relays, controls, pyrometers, panel meters and relays. Complete data are given to aid in selection and application of proper unit.

84. Precision Reamers

DoALL Co.—Hand, shell, expansion, taper pin, stub, chucking and arbor reamers in fractional, letter and number sizes are described in 12-page illustrated catalog 51-814. Of precision type, tools are of high speed steel and can be supplied individually or in sets designed for toolroom and die shop use.

85. Socket Screws

Parker-Kalon Corp.—Slide-type dimension finder enables user to determine all dimensions for cold-forged socket head cap screws, socket set screws, flat head socket cap screws and socket head stripper bolts. Threads per inch and tap drill sizes are included. On reverse side are tabulated sizes for set screw points and socket pipe plugs.

86. Decorative Metal Parts

Electro Chemical Engraving Co.—Company's facilities for manufacturing, finishing and assembling different types of metal decorating products are pictured in 6-page folder entitled "Electro Chemical Can Do It."

FOR MORE INFORMATION USE ONE OF THESE CARDS . . .

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Cleveland, Ohio

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HELPFUL LITERATURE

87. Process Tubing

Babcock & Wilcox Tube Co.—Technical data on seamless or welded stainless, alloy and carbon steel tubing for use in petroleum, chemical, pulp and paper, food and pharmaceutical processing industries are contained in 8-page illustrated bulletin TA 1559. Analyses, tables of physical and mechanical properties and application information are included on 20 popular tubing steels.

88. Motor Controls

Arrow-Hart & Hegeman Electric Co.—Explo-Safe and weatherproof motor starters are detailed in 8-page illustrated bulletin. Available in sizes 0, 1, 2, 3 and 4, these compact starters feature serviceability, overload protection, straight-through wiring and application to any hazardous condition.

89. Drill Jig Bushings

Ace Drill Bushing Co.—8-page illustrated handbook and price list No. 1100 on drill jig bushings covers complete line and provides instant cross reference to 3023 symbols used by other leading manufacturers. Tables compare symbols to ASA standard sizes and specifications used by Ace.

90. Screws and Drivers

United Screw and Bolt Corp.—12-page illustrated booklet "Clutch Head —The Most Modern Screw" describes this type screw and related hand drivers. Full dimensions are tabulated on flat CSK, oval CSK, hexagon, fillister, pan and truss head screws, as well as on minimum hole sizes.

91. Ammunition Heat Treating

Surface Combustion Corp.—Step-by-step heat treat processes required for steel projectiles, steel and brass cartridge cases and belt clips and links are described in bulletin SC-153 with fuel-fired batch and continuous furnaces. Table shows relation of furnaces to steps in making small caliber ammunition.

92. Roll Grinder

Farrel-Birmingham Co.—Type TT roll grinder with traveling work table is subject of 32-page illustrated bulletin No. 113. Machine finishes rolls of chilled iron, alloy iron, steel, brass, rubber, granite or other materials used in rolling any sheet materials, including shafts and cylindrical parts. It is made to take maximum roll diameters of 24, 28 and 32 in. in any length required.

93. Aluminum Castings

Aluminum Industries, Inc. — Described and illustrated in 4-page bulletin 20-A are company's facilities for producing and finishing aluminum alloy castings. X-ray and other flaw detection equipment is shown.

94. Stick Form Soldering Flux

Lake Chemical Co.—Illustrated data sheet and descriptive folder presents information on Flux-Stik soldering flux in stick form. Nonrunning flux can be applied to hot and cold metals with no surface cleaning necessary. It can be used for all metals except aluminum.

95. Cleaning Compound

American Chemical Paint Co.—Deoxidine selection chart No. P-100-48 lists various grades of this phosphoric acid type rust removal, cleaning and conditioning compound. Recommended applications, step-by-step procedures and needed equipment are tabulated.

96. Power Hack Saws

Sales Service Machine Tool Co.—"Keller Power Hack Saws" is title of 4-page bulletin presenting illustrations and specifications of these saws plus accessories. Separate data sheet covers small Jefferson 601 model.

97. Controlled Volume Pumps

Milton Roy Co.—24-page bulletin No. 151 gives complete technical data and illustration of line of reciprocating, positive displacement, controlled volume pumps. Pumps are made in any alloy or metal that can be cast or machined, and color chart lists chemicals and liquids each alloy will safely handle.

98. Paint Sticks

Markal Co.—Application data for 13 types of Paintstiks is given in illustrated folder which also recommends type to be used for many specific applications listed. Paintstik markings are permanent, fadeproof and weatherproof and can be applied to hot or cold surfaces.

99. Industrial Finishes

Glidden Co.—"Cutting Costs with Color" is one of subjects covered in 8-page illustrated Glidden Industrial Review. Finishes for air compressors, desks and chairs, laboratory equipment, appliances and lighting fixtures are also covered.

100. Vibrating Screens

Link-Belt Co.—Fast, accurate dry screening of light and fine materials can be carried out on model UP vibrating screens, described in 20-page illustrated book No. 2377. Also included are model NRM liquid vibrating screens for separation of solids from liquids. Dimension tables, weights, information on how to select right screen and screen cloth, and power requirements are included.

FOR MORE INFORMATION USE ONE OF THESE CARDS . . .

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13	33	53	73	93
14	34	54	74	94
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17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

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What are U. S. Rubber grinding wheels doing for beer and ice cream coolers?

HIGH SPEED portable equipment uses U. S. *Royalite* Wheels to smooth welded joints on cooling unit.

A manufacturer of coolers for beer and ice cream uses "U. S." Wheels to smooth down welded stainless steel joints. The surface must be perfectly smooth, to insure cleanliness as the milk or beer flows over it. These particular wheels are U. S. *Royalite*, specially designed for stainless steel grinding.

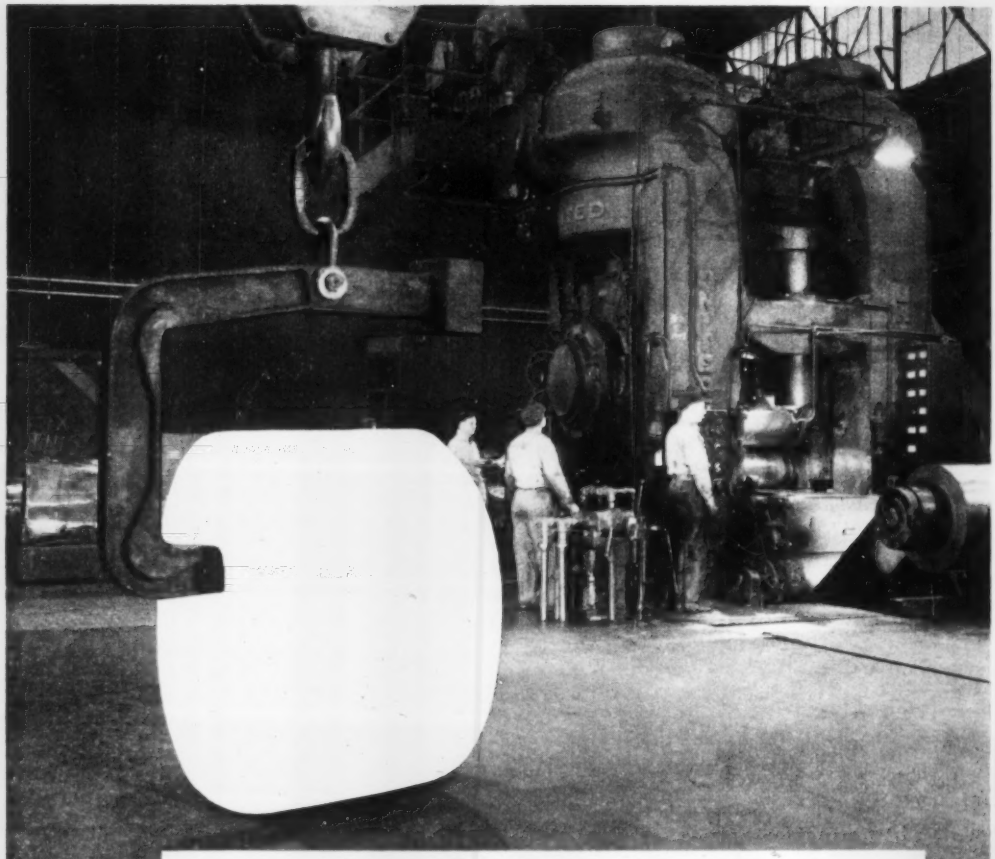
You can maintain top production and decrease your grinding wheel costs by specifying "U. S." wheels. Let "U. S." technicians examine your needs and make the proper recommendations. Write to address below.

GRINDING a weld where air duct is welded to main section of cooler.

Products of U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.



LOST: one 20,000 lb. steel coil!

. . . perhaps the coil *you* ordered, and vitally need . . . lost, in fact, *never produced* because your steel supplier simply didn't have enough scrap metal to do the job!

Unusual? No, every steel manufacturer in America is facing the same problem. New steel requires pig iron *and scrap*. Today, scrap is scarce . . . very scarce.

With scrap, we can supply more steel, better steel, faster. Without it, America's present record steel production cannot continue.

Will you help? Your dormant iron and steel scrap is urgently needed. Survey your plant now. Get every last bit of scrap to your scrap dealer, promptly.

It means more money for you. More steel for America!

GRANITE CITY STEEL COMPANY

GRANITE CITY, ILLINOIS

The Market Outlook

CONTINUED tight supply conditions will prevail in the steel markets throughout first quarter next year. But indications are mill scheduling will be on a much more orderly basis than it has been since last July when the Controlled Materials Plan went into effect. Everything points to more realistic allotting of tonnage by the National Production Authority from here on, which means there will be better balance between production and CMP ticketed orders. Also, restoration of the historic pattern for booking orders will make for more satisfactory mill-customer relationships. A great deal of the confusion in the steel markets in recent months stemmed from the fact the steelmakers were compelled to accept CMP orders on the basis of first-come first served. This meant that in far too many instances regular customers of the mills were left stranded due to booked up condition of their usual suppliers.

SCHEDULING— Except for military requirements and needs covered by special government directives, the steelmakers generally are booking no tonnage for shipment beyond first quarter next year. In fact, with fourth-quarter schedules still subject to change for one reason or another, it is highly improbable that the mills will commit themselves too far ahead. At present, consumers can place no more than 70 per cent of their fourth-quarter allotments for first quarter. Consequently, it will be some time before the steel producers can fully set up schedules for that period. Allotment forms for first quarter are now being mailed by NPA, consumers being allowed until Oct. 1 to return these for final screening.

ALLOTMENTS— Although buyers can place 70 per cent of their fourth-quarter tonnage for first quarter, they cannot specify more than 35 per cent of this tonnage for shipment in any one given month in the period. Also they can place 60 per cent of their fourth-quarter allotments for second quarter next year, and 50 per cent for third quarter, provided they can get the mills to accept the tonnage. This, the producers are declining to do.

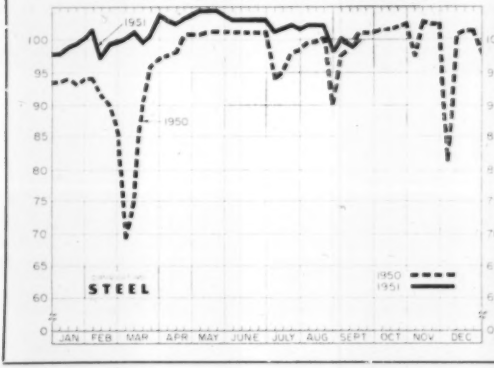
FOURTH QUARTER— While government regulations permit the placing of tonnage orders with the mills for distant delivery, it is interesting to note that some consumers have not yet been advised as to their allotments for fourth quarter this year. Even the deadline for conversion of unrated tonnage to CMP for the period has been extended from Sept. 10 to Sept. 25. Delay in mailing out fourth-quarter allotments is said to be the cause for this extension. Where unrated orders cannot be converted for October it is understood they can be filled from "free" tonnage, provided the mills have any such to offer. So far only few order cancellations have resulted from cutbacks in consumers' allotments; more are expected soon, affecting substantial tonnage.

SCRAP— Major market attention is riveted on scrap. This critical raw material holds the key to future developments as regards steel supply conditions. So far high-level steelmaking operations have been maintained, only minor breaks being experienced at the various production centers. Now, however, an acute shortage of scrap threatens over the coming winter unless current government sponsored salvage drives bring out substantial tonnage soon. Mill stocks are below normal for this season when they should be building up to tide operations over the winter when collection and preparation of scrap are hampered by severe weather.

PRODUCTION— Steelmaking operations advanced 1 point last week to 100 per cent of capacity, equivalent to slightly less than 2 million tons.

PRICES— Undertone of the iron and steel and related markets is firm pricewise. STEEL's weighted index on finished steel holds at 171.92 and compares with 156.99 a year ago. The arithmetical composite on finished steel also is unchanged at $106.32, as are the composites on pig iron with No. 2 foundry grade, $52.54, basic, $52.16, and malleable, $53.27. Steelmaking scrap composite is $44.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Sept. 15	Change	Same Week 1950	Same Week 1949
Pittsburgh	97	— 0.5*	101	82
Chicago	104.5	0*	101.5	93.5
Mid-Atlantic	98	0	98.5	80
Youngstown	106	+ 5	106	95
Wheeling	95	— 1.5	95.5	98
Cleveland	100	— 0.5	101	99
Buffalo	104	0	104	98.5
Birmingham	100	0	100	100
New England	99	+ 5	78	74
Cincinnati	103	0	106	96
St. Louis	92.5	— 11.5	91	89.5
Detroit	103.5	— 7.5*	106	100
Western	99	— 3	103.5	76
Estimated national rate	100	+ 1	101	86.5

Based on weekly steelmaking capacity of 1,999,034 tons for 1951, 1,928,721 tons for second half, 1950; 1,900,268 tons for first half, 1950; 1,843,316 tons for 1949.

*Change from revised rate for preceding week.

Composite Market Averages

	Sept. 13 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av. =100)	171.92	171.92	171.92	156.99	112.04
Index in cents per lb.	4.657	4.657	4.657	4.253	3.035
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$94.50	$64.45
No. 2 Fdry, Pig Iron, GT	52.54	52.54	52.54	46.85	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	45.97	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	47.49	28.79
Steelmaking Scrap, GT	44.00	44.00	44.00	41.08	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Sept. 13 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.223	4.223	4.20	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10-15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Philadelphia	3.918	3.918	3.91	3.46	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.90	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.90	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	3.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.50	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-50	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.50	3.15
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-95	3.15
Wire, Basc, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.30	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts.(NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, ½-⅝", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47-$50	$29.00
Basic, Valley	52.00	52.00	52.00	46.00	28.00
Basic, del. Phila.	56.61	56.61	56.49	50.39	29.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry, Valley	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry, Del. Phila.	57.11	57.11	56.99	50.89	29.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	42.38	24.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.33	49.08	28.94
Malleable Valley	52.50	52.50	52.50	46.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.00	$45.00	$45.00	$44.00	$20.00
No. 1 Heavy Melt, E. Pa.	43.50	43.50	43.50	39.25	18.75
No. 1 Heavy Melt, Chicago	43.50	43.50	43.50	40.00	18.75
No. 1 Heavy Melt, Valley	45.00	45.00	45.00	43.75	20.00
No. 1 Heavy Melt, Cleve.	44.00	44.00	44.00	42.25	19.50
No. 1 Heavy Melt, Buffalo	44.00	44.00	44.00	41.50	19.50
Rails, Rerolling, Chicago	52.50	52.50	52.50	59.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	49.50	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	16.00	9.50
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	22.50-23.50	14.375
Zinc, E. St. Louis	17.50	17.50	17.50	17.50	8.25
Lead, St. Louis	16.50	16.50	16.50	15.50	8.10
Tin, New York	103.00	103.00	103.00	103.50	52.00
Aluminum, del.	19.00	19.00	19.00	17.50	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	32.00	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S8	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88‡	55.38‡	55.88‡	....
Syracuse, N.Y., del.	55.91‡	56.41‡	56.91‡	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	....	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.65	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	55.25	55.75	....
Fontana, Calif. K1	58.00	58.50	....	....
Geneva, Utah G1	52.00	52.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Provo, Utah C11	52.00	52.50	....	....
Lone Star, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N. & S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O. del.	56.65	57.15	57.15	57.65

* Low phos, southern grade. ‡ Preliminary.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry., frt. allowed K2	92.50
Keokuk, OH & Fdry., 12% lb piglets, 14% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia, delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCFR as reported to STEEL, Sept. 13, 1951; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 ....52.00

INGOTS, Alloy (NT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 ....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y. B2 ..56.00
Munhall,Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ..56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 ....66.00
Canton,O. R2 ....86.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....66.00
Geneva,Utah G1 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 ..66.00
So.Duquesne,Pa. U5 ..66.00
So.SanFrancisco B3 ..85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$70.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 ....70.00
Houston,Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....70.00
Munhall,Pa. U5 ....70.00
So.Chicago R2,U5,W14 ..70.00
So.Duquesne,Pa. U5 ..70.00
Struthers,O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ....82.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown, R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 ....4.10
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
LosAngeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.10
No.Tonawanda,N.Y. B11 ..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 ....4.20
So. Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah G1 ....3.65
Houston,Tex. S5 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....6.25
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.30
So.Chicago,Ill. U5, W14 ..3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana, Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah G1 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14) B2 5.50
LosAngeles B3 ....6.05
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ..3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala. T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 ....5.65
Geneva,Utah G1 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor, Ind. Y1 ....6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 ....5.65
Youngstown, Y1 ....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..5.95
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
Sharon,Pa. S3 ....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ..4.75
Harrisburg,Pa. C5 ....5.95
Ind.Harbor, Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago, Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ....3.95
Ashland,lcl(15) A10 ....4.45
Cleveland,c.l. R2 ....4.30
Warren,O.,c.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky.(15) A10 ..3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ..4.15
Fairfield,Ala. T2 ....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 ....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah, G1 ....3.70
Harrisburg,Pa. C5 ....6.75
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 ....3.70
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.95
So.Chicago,Ill. U5, W14 3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1..3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva,Utah G1 ....4.85

PLATES, Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill. L1 ....4.15
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana, Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
KansasCity, Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11 ..3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
So.Chicago R2,U5,W14 ..3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 ....5.05
Portland,Oreg. O4 ....4.65
SanFrancisco S7 ....4.85

BAR SIZE ANGLES,H.R. CARBON
Bethlehem,Pa. B2 ....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Detroit R7 ....4.45
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston,Tex. S5 ....4.70
Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Chicago R2,U5,W14..4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary, Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H. R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ..6.05
Johnstown,Pa. B2 ....5.55
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers, O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 4.55
Buffalo B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.56
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.65
Elyria,O. Ws 4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay, Wis. F7 ....4.55
Hammond,Ind. L2, M13 4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R5 ....4.55
Monaca,Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.55
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3 ..5.00
Struthers,O. Y1 ....4.56
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. WS 5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 5.40
Hartford,Conn. R2 ....5.55
Harvey,Ill B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2,R5 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
Chicago(1,2) C2 ....4.75
Franklin,Pa.(3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ..4.85
Huntngtn,W.Va.(3) W7 ..5.50
Marion,O.(3) P11 ....4.75
Moline,Ill.(3) B2 ....3.80
Tonawanda (3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ....13.50
Dover(Wrgt.Iron) U1 ....12.25
Economy,Pa.(S.R.) B14..9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt) L5..14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ....3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
So.Chicago R2,U5,W14 ..3.70
So.SanFrancisco B3 ....4.45
Sparrows Point,Md. B2 ..3.70
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....3.85
Youngstown U5, Y1 ....3.70

SHEETS, H.R. (10 gage)
AlabamaCity,Ala. R2 ..475
Dover,O. R1 ....5.65
Ind.Harbor,Ind. I-2, ...5.40
Mansfield,O. E6 ....5.65
Niles,O. N12 ....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R. (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ....5.40
Conshohocken,Pa. A3 ..5.95
Ecorse,Mich. G5 ....5.95
Fairfield,Ala. T2 ....5.40
Fontana,Calif. K1 ....6.35
Gary,Ind. U5 ....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1..5.90
Irvin,Pa. U5 ....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 ....5.40
Sharon,Pa. S3 ....5.40
So.Chicago,Ill. U5 ....5.40
SparrowsPoint(36) B2 ..5.40
Warren,O. R2 ....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 ....5.40
Youngstown Y1 ....5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ....6.55
Ecorse,Mich. G5 ....7.10
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.55
IndianaHarbor,Ind. Y1..7.05
IndianaHarbor,Ind. I-2 ..6.55
Irvin,Pa. U5 ....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 ....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 ....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 ....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb. Coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16	Cu	Cu Fe
Ashland,Ky. A10,	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2,	5.60	5.85
Gary U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt., B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TINPLATE,American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2,	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1,	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10,	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. N12	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgprt.Conn.(10)	S15.5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10)	S15.5.45
Sharon,Pa. S8	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.Ind. Y1	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
Sparrowspoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10)	S15.4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	3.50
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt.Conn.(10)	S15 10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.60
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10)	S15 5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10)	S15 5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. NS; Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	...	6.80	7.40	9.35	11.65

STRIP, Spring Steel (Tempered)

Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10)	S15.5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
FranklinPark,Ill.(40)T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) NS	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

TIN PLATE, Electrolytic (Base Box)	0.25-lb	0.50 lb	0.75lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolard Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Alabama City R2	5.70 5.95
Aliquippa J5	5.70 6.15
Atlanta A11	5.95 6.40
Bartonville(19) K4	5.70 6.15
Buffalo W12	4.85 ...
Cleveland A7	5.70 6.15
Crawfordsville MS	5.95 6.40
Donora,Pa. A7	5.70 6.15
Duluth,Minn. A7	5.70 6.15
Fairfield T2	5.70 6.15
Houston, Tex. S5	6.10 6.55
Johnstown B2	5.70 6.15
Joliet, Ill. A7	5.70 6.15
KansasCy,Mo. S5	6.30 6.75
Kokomo C16	5.80 6.05
LosAngeles B3	6.65 ...
Minnequa C10	5.95 6.45
Monessen P7	5.95 6.40
Palmer W12	5.15 ...
Pitts.Calif. C11	6.65 6.80
Prtsmth.(18)P12	6.10 6.60
Rankin A7	5.70 6.15
So.Chicago R2	5.70 5.95
So.S.Fran. C10	6.65 7.10
SparrowsPt. B2	5.80 6.25
Sterling,Ill.(1)N15	5.70 6.15
Struthers,O. Y1	5.70 6.15
Torrance,Cal. C11	6.65 ...
Worcester A7	6.00 6.45

WIRE (16 gage)	An'ld Galv. Stone	Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsvile MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.C12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE

	(A)	(B)
Alter Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J., R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.05
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. MS	5.10
Donora,Pa. A7	4.85
Duluth,Pa. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet, Ill. A7	4.85
KansasCity, Mo. S5	5.45
Kokomo,Ind. C16	4.95
Los Angeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer, Mass W12	5.15
Pittsburg, Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So. SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.60
Crawfordsville,Ind. MS	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
Franklin Park,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) NS	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.15
Worcester T6	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville, Ind. MS	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J., R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
SoSanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
WaukeganIll. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	126
Ala.City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	130
Crawfordsville,Ind. MS	132
Donora,Pa. A7	130
Duluth,Minn. A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	207
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pittsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

Chicago(18),Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	144
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. MS	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawfordsville,Ind. MS	6.30
Donora,Pa. A7	5.95
Duluth,Minn. A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.40
Portsmouth,O.(18) P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

RAILS	Std. No. 1	Std. No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	(16)4.00	...
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

NAILS & STAPLES, Stock

To dealers & mfrs. (1)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M2	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.55
Lebanon,Pa. B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S1S	5.60
Johnstown,Pa. B2	5.60

Key to Producers

M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M5	Medart Co.
M6	Mercer Tube & Mfg. Co.
M8	Mid-States Steel & Wire
M9	Midvale Co.
M12	Moltrup Steel Products
M13	Monarch Steel Co.
M14	McInnes Steel Co.
N2	National Supply Co.
N3	National Tube Co.
N5	Nelsen Steel & Wire Co.
N6	NewEng-HighCarb.,Wire
N8	Newman-Crosby Steel
N12	Niles Rolling Mill Co.
N14	Nrthwst. Steel Roll. Mills
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
O3	Oliver Iron & Steel Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke & Chem.
P7	Pittsburgh Steel Co.
P9	Pittsburgh Tube Co.
P11	Pollak Steel Co.
P12	Portsmouth Division, Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	RellianceDiv.,EatonMfg.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S5	Sheffield Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S9	Sloss-Sheffield, S.&I. Co.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S16	Struthers Iron & Steel
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
S20	Southern States Steel
T2	Tenn. Coal, Iron & R.R.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
U1	Ulster Iron Works
U4	Universal Cyclops Steel
U5	United States Steel Co.
V2	Vanadium-Alloys Steel
V3	Vulcan Crucible Steel Co.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	West.Auto.Mach.Screw
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div. International Harvester
W15	Woodward Iron Co.
W18	Wyckoff Steel Co.
Y1	YoungstownSheet&Tube

TOOL STEEL

—Grade by Analysis—

Grade	$ per lb	W	Cr	V	Co	Mo	$ per lb
Reg. Carbon	0.230	20.25	4.25	1.6	12.25	...	3.535-3.675
Extra Carbon	0.270	19	4	2	7	...	2.460
Spec. Carbon	0.325	18.25	4.25	1	4.75	...	2.125
Oil Hardening	0.350	18	4	2	9	...	2.445-2.450
5%CrHotWrk	0.350	13.5	4	3	...	...	1.604
Hi-Carbon-Cr	0.635	6.4	4.5	1.9	5	0.96-0.965	
18W,4Cr,1V	1.505	6	4	3	6	...	1.190
18W,4Cr,2V	1.650	1.5	4	1	...	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh basis.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 26" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared: add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

WIRE

REQUIREMENTS?

CHECK WICKWIRE

We can meet your specifications for specialty steel wire of high or low carbon . . . round or shaped . . . in an extensive range of sizes, tempers, grades and finishes.

When you specify Wickwire Wire you can be sure of unvarying uniformity in quality, size, tensile strength and stiffness. That's because every step of its production, starting in our own blast furnaces is under constant and careful control . . . subject to rigid testing and inspection.

It pays to remember: For the Wire You Require—Check First with *Wickwire*.

For additional information write or phone our nearest sales office.

THE COLORADO FUEL & IRON CORPORATION, Denver, Colorado
THE CALIFORNIA WIRE CLOTH CORPORATION, Oakland, California
WICKWIRE SPENCER STEEL DIVISION, Atlanta • Boston • Buffalo
Chicago • Detroit • New York • Philadelphia

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	B	C	Galvanized D	E	F
⅛	3.56	0.24	34.0	32.0	29.0	1.5	0.5	3.5
¼	6.0	0.42	28.5	26.5	23.5	1.0	3.0	6.0
⅜	8.0	0.57	23.5	21.5	18.5	7.0	9.0	12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	12.0
¾	11.5	1.13	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.0	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	41.0	41.0	22.0	24.0	21.0
1½	27.5	2.73	42.5	41.5	42.0	22.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	58.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2. Butler, Pa. ½-3½", F6. Benwood, W. Va. 3½ points lower on ½-2", 1½ points lower on 2½" and 2 points lower on 3-8". W10. Sharon, Pa. M6. 1 point higher on ½-2", 2 points lower on ¼" and ⅜". Fidelity, Ill. stoke. C7 and steer, Lorain, O. N3. Youngstown R2 and 50½% on 3½" and 1½. Youngstown Y1. Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11½ points lower on ½" and lower continuous weld and 24½ on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind. ½" through 3", Y1. Alton, Ill., 2 points lower discount L1.

Column D: Butler, Pa. F6. ½-3½". Benwood, W. Va. W10, except plus 3½ on ½-plus 2½ on ¾" plus 9½ on 1-3". Sharon, Pa. M6. Plus 0.3 on ½". 1 point lower on ¾-3". 1½ points lower on 3½" and 1½". 2 points lower on 1", 2", 2½" and 3". Following quote only on ½" and lower: Lorain, O. N3. Youngstown R2, and 16½% on 3½" and 4". Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ½-2, 2 points lower on 1". 1½ points lower on 1½". 2 points lower on 1½ and 2". 1½ points lower on 2½" and 3". Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Galv. B	Elec. Weld Black C	Galv. D
2	37.00	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	13.5	32.5	12.5
3	78.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.80	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5. Ambridge N2. Lorain N3. Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2". 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.17	15.36	15.56
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.23	20.50
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2¾	12	29.65	36.32	29.37	34.76
3	12	32.11	39.33	31.53	36.84
3½	12	37.00	41.64	32.89	38.76

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates 10%	Plates 20%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
302				19.75	26.24	77.00
					27.50	
304	25.00	29.50		21.50	27.50	77.00
					27.72	
309	36.50	35.00				111.00
310	36.50	41.00				
316	29.50	34.00		26.00	35.92	
					36.50	
317	31.50	39.00				
318	33.50	38.00				
321	26.50	31.00		23.00	33.00	111.00
		32.00			33.83	
347	27.50	32.00		24.00	33.50	136.00
					33.83	
405	21.25	27.75				
410	20.75	27.25				
Nickel	33.50	45.15	41.00	54.00		
Inconel	41.23	54.18				165.00
Monel	34.93	46.28				
Copper			24.70	29.65		

Deoxidized 28.20c for hot-rolled. 1 26.46c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

⅜ in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ¾-in.	18.5
⅞-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg. Hvy.
½-in. & smaller	15 15
⅝-in. & ¾-in.	12 6.5
⅞-in.-1-in.	9 1
1⅛-in. & larger	7.5 1
H.P. Hex.	
½-in. & smaller	26 22
⅝-in. & ¾-in.	18.5 6.5
⅞-in.-1-in.	12 2
1⅛-in. & larger	8.5 2
C.P. Hex.	
½-in. & smaller	26 22
⅝-in. & ¾-in.	23 17.5
⅞-in. & 1-in.	18.5 12
1⅛-in. & larger	12 6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or key quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ¾-in.	29.5	22
⅞-in.-1-in.	24	15
1⅛-in. & larger	13	8.5
Jam		Light
½-in. & smaller		35
⅝-in. to ¾-in.		28.5
⅞-in. to 1-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel, packaged, per cent off list)

6 in. or shorter:

½-in. & smaller	12
⅝-in. through 1 in.	34
Longer than 6 in.:	
½-in. & smaller	26
⅝-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged, per cent off list)

1 in. diam. x 6 in. and shorter 38

1 in. and smaller diam. X over 6 in. 26

HEADLESS SET SCREWS

(Packaged, per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F. o. b. midwestern plants

Structural ½-in., larger 7.5c

⅝-in. under 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers. List to list-plus-$1

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF content, 70% $45; 60% $40

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches	Length	Cents per lb
17, 18, 20	60-72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

35,40	110	8.60
30	65,84,130	8.60
24	72 to 104	8.60
17 to 20	34,56	8.60

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars, Wire, Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	54.00	60.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	36.50	29.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	34.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bait., Types 301-347 sheet, quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, except 303 and 309. F2.

Brackenridge, Pa., sheets A4 sheets & strip U1.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502. A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347, 0.40c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip Types 31.00 on Type 301; 36.50, 302; 38.50, 304; 48.50, 316; 52.00, 347; 36.50, 410; 31.00, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind. bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410, bars & wire, Types 410 through 430 and 51.25c on Type 302, 33.75c on 303, 52.75c on 304, 48.75c on 316, 39.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & Strip C18.

Marshall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars except 31.50c on Type 301 and 43.25c on 309 A4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S5.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 301, 309, 316, sheets 62.00, strip 64.00 W4.

Waterbury, N. Y., structurals & bars A4 quotes slight variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25 on Type 301 R5.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg. 26.00-33.00

Industrial xylol 25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia $32-$45

Cents per pound, ovens

Phenol, 40 carlots, non-returnable drums 17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron	Cents
98+% Fe, carlots	16.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5+% Fe	42.50
Unannealed, 99+% Fe	36.50
Unannealed, 99+% Fe -minus 325 mesh	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Brass, 10-ton lots	50.00-53.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10-ton lots	56.00
Copper:	
Electrolytic	43.25
Reduced	32.75-37.75
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel, unannealed	83.00
Nickel-Silver, 10-ton lots	44.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
99% minus 80 to 200 mesh freight allowed:	
1000 lb and over	4.00
Less than 1000 lb	4.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum:	
99% minus 80 to 200 mesh, over 500 lb	2.85
200 to 500 lb	3.10
less than 200 lb	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvill fur.	$14.50-15.00
Connellsvill fdry.	17.00-18.00
New River foundry	21.50
Wise county, foundry	15.50
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearny, N. J., ovens	$22.75
Everett, Mass., ovens, New England, del.	24.80
Chicago ovens	23.60
Chicago, del.	24.10
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.12
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Neville Island, Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., oven	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.60
Buffalo, del.	26.80
Flint, del.	26.50
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.

for

80Bxx, 81Bxx and 94Bxx Steels

with maximum properties

USE *Grainal* ALLOYS

Maximum hardenability in very low alloy steels, with dependable uniformity of results, is assured by the addition of Grainal alloys.

The use of Grainal alloys promotes maximum hardenability with minimum amount of boron. The possibility of obtaining undesirable effects resulting from over-treatment by boron is avoided by the action of other elements of Grainal alloys in combining with oxygen and nitrogen and permitting full utilization of the low boron content.

More than a million and a half tons of steels made with Grainal have proved the superiority of these alloys in producing maximum hardenability.

VANADIUM CORPORATION OF AMERICA

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MAKERS OF ALLOYS

VANCORAM

CHEMICALS AND METALS

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.94
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65‡‡	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45‡‡	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10‡‡	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.56	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.36	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05‡	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85‡	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80‡	8.90‡	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60‡	9.20‡	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded); and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; *—500 to 1499 lb; ‡—450 to 1499 lb; §—3500 lb and over; ‡‡—1000 to 1999 lb.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa., $99.60, Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76. Ottawa, Ill., $70.

Ladle Brick

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

Malleable Bung Brick

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

Basic Brick

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite, $88-$93.

Magnesite

Per net ton, Chewelah, Wash. Domestic dead-burned, ⅝" grains; bulk, $36.30; single paper bags, $41.80.

Dolomite

Per net ton. Domestic burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Narlo, Clay Center, Woodville, Gibsonburg, Bettsville, O., Billmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

NOTE: For current quotations on manganese, titanium, and "other" ferroalloys, see page 159. Sept. 3 issue; for chromium, silicon, vanadium, boron, tungsten alloys, page 163, Sept. 10 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

STEELMAKING SCRAP COMPOSITE

Sept. 13	$44.00
Sept. 6	44.00
July 1951	44.00
Aug. 1950	40.00
Aug. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade) 1

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	42.00	44.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Busheling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Edry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	+ 2.00
21. 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut-Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy Breakable	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.

(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3.

(4) For preparing into Grade No. 25, $6.

(5) For preparing into Grade No. 19, $6.

(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) For preparing into Grade No. 17 or Grade No. 21, $11.

(8) For preparing into Grade No. 18 or Grade No. 20, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

(3) For preparing into Grade No. 16, $4.

(4) For preparing into Grade No. 17, $5.

(5) For preparing into Grade No. 18, $7.

(6) For preparing into Grade No. 21, $4.

(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commissions shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 in. x 24 in. x 8 in. and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.

Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.

Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del., (including Chester, Pa.), Cleveland, 76c.

Coatesville, Pa., 56c; Conshohocken, Pa., 20c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, Tex., 57c.

Johnstown, Pa., 75c.

Kansas City, Mo., 78c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, W. Va., 70c.

Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory, prep'd.	33.00
Bushelings new factory, unprep'd.	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast	58.00-60.00

* F.o.b. shipping point.

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The facilities and experienced personnel in each of our offices, stand ready to supply your every scrap requirement whenever and wherever needed.

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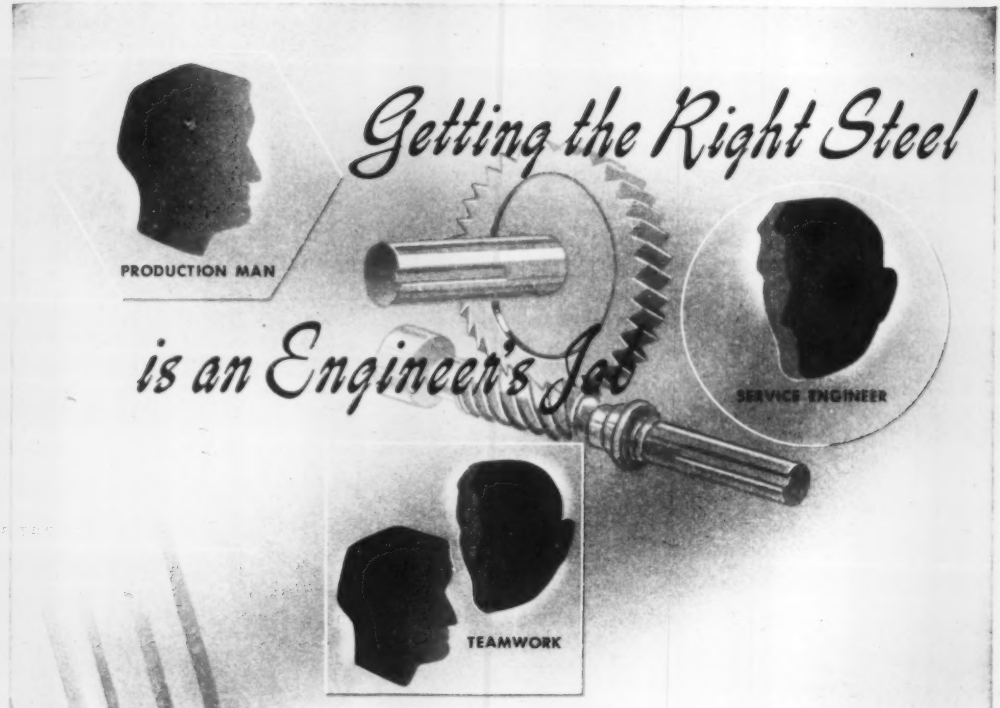
LEADERS IN IRON AND STEEL SCRAP SINCE 1869



TWO heads are better than one in tackling today's steel problems . . . especially when *one* is a B&L service engineer, trained by practical experience in the selection, fabrication and application of Cold Finished Bar Steels. Busy plants everywhere look to Bliss & Laughlin for on-the-job teamwork in getting the right steel to keep production rolling. It saves time when you refer your problems to a B&L technical man if you want to find acceptable substitutes for hard-to-get steels . . . or need help on proper methods of machining or heat treating for best results in using alternate grades.

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Cold Finished BAR STEELS

COLD DRAWN BARS AND SHAFTING, SCREW STOCK, ALLOY STEELS, STRAIN-TEMPERED BAR STEELS

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BLISS & LAUGHLIN, INC.

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SINCE 1891

The Metal Market

Brass mills threatened with enforced shutdowns unless govment releases additional copper supplies from stockpile. Revere celebrates 150th anniversary.

RELIEF from the copper shortage, aggravated by prolonged labor trouble, must come through withdrawals from the government's stockpiles. These are unofficially reported to be in excess of 500,000 tons.

Release of possibly as much as 50,000 tons of copper is urged by James J. Russell, president, Revere Copper & Brass Inc., New York. "If more copper isn't taken out of the stockpile to aid the defense program and industry, I don't know how we will get through October," he said.

A few weeks ago the Munitions Board authorized the "loan" of 25,000 tons to relieve the shortage created by the July closing of the Garfield, Utah, copper smelter, but trade sources say that only half of this authorization has been distributed so far to consumer channels.

Mr. Russell said Revere Copper & Brass has only a week's supply of copper on hand of all sizes and shapes and only about three day's supply of copper wire bars. The firm's supply of copper and brass mill scrap too is only about half of what is needed. Setting up of the Controlled Materials Plan continues to result in "terrible confusion," he added. His company should be establishing fourth-quarter schedules now, but has not as yet any idea as to precisely how much copper and other metals will be allotted.

Acute Shortage—The situation at Revere's plants is typical of the serious supply situation facing the entire industry. The overall average rate of operations for brass mills is 65 to 70 per cent of capacity, or what could be attained were copper available. Loss of tonnage by strikes will be felt in force about mid-fourth quarter. Some mills are confining production to directly rated or CMP allotments this month prior to October schedules. This has taken out of schedules considerable civilian order volume.

To further dim the outlook for metal supply, flow of copper scrap is lagging and may not exceed 850,000 tons this year compared with 950,000 tons in 1950.

Revere Copper & Brass is opperating at only 50 per cent of capacity "but we would be going full tilt, three turns a day every day if we had the metal," the company's president emphasized. Defense is accounting for almost 25 per cent of the total, but the firm's backlog of all orders is big enough to keep the plants going full scale for at least three months. The company is preparing for early manufacture of rockets at its Rome Mfg. Co. Division and for production of steel shells at its Clinton, Ill., plant.

A 25 per cent increase in tube capacity and installation of two 4-high strip mills, with twice the speed of present equipment, are scheduled for Revere's Rome Division, Rome, N. Y.

These two projects will cost approximately $2,250,000 and are included in a $4 million expansion and improvements program now going forward at various units of the company.

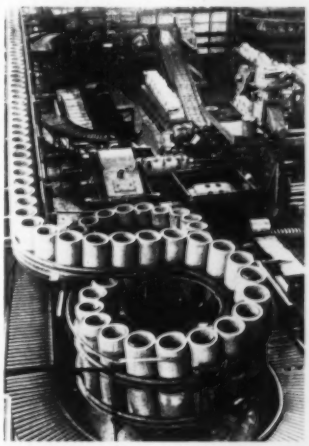
Increase in the tube capacity should become effective in March, 1952. Construction of 250,000 square feet of floor space is now being completed, with installation of equipment scheduled to begin in November. The cost will be $1 million.

Foundation work at the first of the two 4-high mills has been started. The mills will roll light gage 25 inch strip and will have a speed of 1000 feet per minute.

These and other phases of the company's activities were outlined by Mr. Russell at the 150th anniversary celebration of the founding by Paul Revere of the United States copper industry and of the Revere firm in 1801.

The celebration was marked by an "open house," Sept. 8-9, at Rome Division and Rome Mfg. Co. Division. Attendance was close to 40,000 (almost the equivalent of the total population of Rome) with food and refreshments for all. Special 3-car trains, gaily decorated with bunting, provided rapid shuttle service between the two Revere plants for the convenience of the visitors.

E. H. R. Revere, 84-year old great-grandson of Paul Revere, and active as a director of the company, and Paul Revere IV, great-great-grandson and a stockholder, participated in the ceremonies.



CORKSCREW: An extensive conveyor system handles metal automatically at various processing stages in the first rundown section of Revere Copper & Brass Inc.'s Rome division mill in Rome, N. Y. Metal in storage reservoir of conveyor system is in foreground. First rundown mill at center right is of 4-high type. Double-deck recuperative type annealing furnace is in extreme background

World Tin Prices Decline

Tin prices in the world markets are sinking rapidly toward the level, $1.12 a pound, established in the 30-day tin contract between Boliva and the Reconstruction Finance Corp. A long-term contract is now being negotiated. RFC continues to sell Grade A metal to domestic users at $1.03 a pound.

Metal Shortages More Acute

Operations at copper, lead and zinc properties are slowly returning to normal following settlement of the nationwide strike of the International Union of Mine, Mill and Smelter Workers. Effects of this strike will be felt in consuming industries for months ahead.

While users of copper and zinc are urging the government to release metal from its permanent stockpile, the August report on zinc statistics revealed that 5295 tons of zinc were stockpiled by the government. This is the largest withdrawal since December, 1950. August production of slab zinc declined to 74,035 tons from 78,955 tons in July while shipments to domestic consumers eased to 65,696 tons from 76,461. Smelters' stocks total only 11,244 tons while their unfilled orders amount to 62,867 tons.

Shortage of zinc is curtailing galvanizing operations sharply. Several midwestern mills have reduced consumption as much as 50 per cent. Some have been able to obtain only a portion of the zinc tonnage alloted them for use this month.

Lead supplies are tighter with some sellers completely booked for September. As in zinc, many consumers holding allocation authorizations are still looking around for a seller to fill them. Canadian lead has been purchased at 19.25c with the duty of 1 1/16 cents a pound for the buyer's account.

Aluminum Output Rises

Additional capacity recently placed in operation enabled the domestic primary aluminum industry to increase its output in July about 8 per cent to 145,395,271 pounds, or about 10.5 million pounds over the 134,906,971 pounds turned out in June.

Part of this increase was made possible by the opening of a new pot line in the Jones Mills, Ark., smelter of Reynolds Metals Co. and part by the reactivation program of Aluminum Co. of America, in which high-cost electric power is being utilized to operate previously idle equipment for the duration of the expanded defense effort.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.); other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs 58.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $195-$200 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.16c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill, effective Aug. 25, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.15; red brass, 85% 40.14; 80% 39.67; best quality 39.15; nickel silver, 10% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 44.72; yellow brass 41.25; commercial bronze, 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass, 39.44.

(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, carlots 27.25c; 1 to 5 tons 27.50c; less than 1 ton 28.00c. Fine, soft, f.o.b. eastern mills, carlots 28.00c; 1 to 5 tons 28.25c; less than 1 ton 28.75c. Weatherproof, f.o.b. eastern mills, carlots 29.00-30.00c; 1 to 5 tons 29.25-30.25c; less than 1 ton 29.75-30.75c. Magnet, del., 15,000 lb or more 31.50-32.50c; 1 to 5 tons 32.25-33.25c; less than 1 ton 33.25-34.25c.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.3	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Sept. 1-13	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. 1-31	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.925	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.750	19.00	42.00	50.50	90.16
Feb. Avg.	24.50	16.80	17.50	182.716	19.00	42.00	50.50	90.16
Jan. Avg.	24.50	16.80	17.50	171.798	19.00	35.462	50.50	88.890

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb. f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.000; more than 2000 lb, 98.09c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.625
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	20.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material. Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 53 cents per lb of tin content; mixed brass borings 18.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50; engravers' and lithographers' plates 14.50c; die cast slabs, min. 90% zinc, 12.25, old zinc scrap, 11.25c; forming and stamping dies, 11.25; new die cast scrap, 10.75; old zinc die cast radiator grills, 10.50; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb. Used storage batteries (in boxes), drained of liquid, 6.60c for 15,000 lb or more; 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50, high grade borings and turnings, 8.50. No. 12 piston borings and turnings, 7.50. Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

Sheets, Strip . . .

Sheet and Strip Prices, Page 153 & 154

Cleveland—Sheetmakers are accepting forward bookings only through first quarter except for high-rated military tonnage. Only here and there has there been any sign of a slackening in demand pressure. In several instances it is understood manufacturers have rejected proffered tonnage, especially of seconds, but this is exceptional. Generally, customers continue to take every pound of metal offered them, including manufacturers of home appliances and other civilian goods. Galvanized sheets are in very tight supply with production restricted by the shortage of zinc.

New York—Sheet sellers received some fourth quarter cancellations. B product manufacturers originally were allowed to specify up to 70 per cent of their third quarter allotments, but now some are advised they will not be allowed to receive that much and they must cancel the difference.

Philadelphia—Notwithstanding fact some consumers have specified more tonnage for fourth quarter than final allotments will permit, sheet producers say that to date cancellations have been light. They expect more before the month is over, likely causing readjustments in mill schedules in November and December.

Pittsburgh—Fabricators' inventory positions are good in view of consumer durable production limitations. Better sheet and strip supply is indicated by fewer complaints from sheet purchasers than from other product buyers. Demand pressure will lessen for first quarter deliveries and it is expected that demand-supply balance will be achieved in sheet market before other major product markets, barring all-out war or revision of product mix on continuous mills.

Chicago—Pressure for light flat-rolled products is easier, though demand still outstrips supply. Any slack developing from a slowing down in civilian goods manufacture is quickly taken up by expanding military and related needs. Further cutbacks in civilian goods are expected, though some improvement in appliance sales is reported. Sheet supply stringency is especially acute in galvanized, producers of which have been forced to curtail production sharply due to severe zinc shortage.

St. Louis—Fourth quarter sheet allocations are out, representing about the same tonnage to civilian consumption despite increasing rated orders. There is no abatement in demand, but the steel market is less chaotic with exception of galvanized sheets.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 153

Chicago—Reinforcing steel is in as tight supply as structurals. Consequently, building work is hampered. Numerous small inquiries continue to come out, and over the past week several lots involving more than 100 tons were placed with sellers in this district. Since Sept. 1, Inland Steel Co. has been quoting rail steel bars at 4.75c, Chicago Heights, Ill.

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Management and workers alike know their plant is safeguarded from fire. No chance of a short circuit, a stray spark, a forgotten cigarette or spontaneous combustion starting a raging fire that could cut into vital production time, endanger the lives of employees or damage hard-to-get equipment, thanks to efficient, quick-acting C-O-TWO Fire Protection Equipment.

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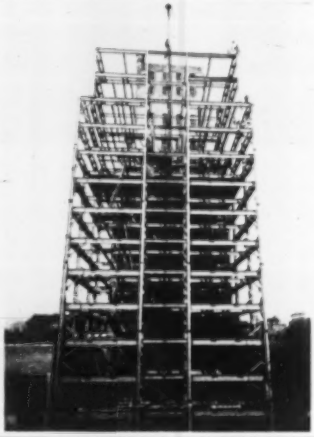

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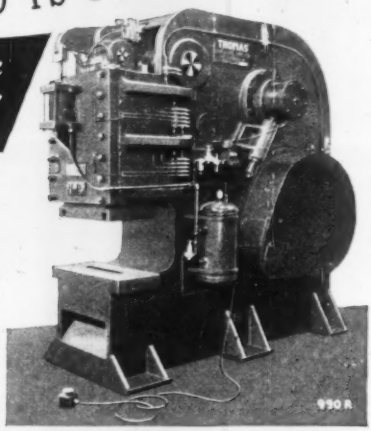

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For rounds, squares, flats, angles or channels

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH (23), PA.

28

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

Steel Bars . . .

Bar Prices, Page 153

Pittsburgh—some rearranging of bar mill schedules is noted as producers attempt to improve their carryover position and to ease critical shortages as they occur with customers. Over-issue of CMP allotments in third quarter, in some cases in excess of 50 per cent of producing capacity, is cause of unsettled condition. Producers will be plagued with the burden at least until first quarter 1952. Cold-finished bar producers are pressing supply sources for aid until NPA guarantee of 110 per cent base period receipts becomes valid for first quarter.

New York—Most hot bar sellers are accepting orders for first quarter, but nothing beyond unless accompanied by military directives. Regular customers are receiving preference in the scheduling. Bar sellers are receiving a few cancellations.

Philadelphia—While one leading bar producer has not opened books for first quarter on the general run of CMP tonnage, virtually all others have and are limiting future acceptances to that period only, except for top priority work.

Cleveland—Tight supply condition in the merchant bar market promises to hold right through first quarter of next year. Indications are there will be substantial carryover from fourth quarter with the mills booked to capacity. As a result, barmakers are moving slowly in opening books for the first three months of next year.

Chicago—Tight supply conditions in merchant bars show no signs of easing. Producers anticipate some cutbacks in allotments for fourth quarter, but so far few cancellations have come through. As a result, some CMP tickets are awaiting placement.

Plates . . .

Plate Prices, Page 153

Philadelphia—Plate consumers are pressing as hard as ever for tonnage, with inquiries extending into third quarter of next year. Mills are limiting acceptances to first quarter, except for government directives and ratings falling in the A-E series. District mill operations continue at peak.

Boston—Plate orders for first quarter against higher rated requirements are appearing. Fourth quarter allotments to numerous fabricators are slightly lower, but more consumers have tickets for steel than in the preceding period. Boiler shops have small backlogs, but are taking their full allocations of steel. Program to bolster machine tool production will mean more steel to weldment shops.

Pittsburgh—Plate producers are accepting limited orders for first quarter, guarding against the possibility of large carryover from fourth quarter. Light plates are in greatest demand. "Dry runs" on production controls this month may point the way to better balance of CMP allotments and production figures.

Chicago—Steel supply situation in this area is tightest in plates. Fabricators are pressing the mills for tonnage with about 25 per cent of output earmarked for military account. Expectations are this per-

centage will move steadily upward as additional military programs get under full steam.

Seattle—Several sizable plate jobs are up for early attention, but await completion of plans and government release of materials. Small shops are seeking defense contracts to assure materials to continue current operations.

Wire . . .

Wire Prices, Page 155

Boston—Fourth-quarter allocations of wire to users, including consumer goods manufacturers, are for the most part sufficient to maintain current operations. Overall allotments of heading wire are only 2 per cent under those for the third quarter. On the other hand, some wire consumers have allotments for fourth quarter who did not have them for the third.

Cleveland—First quarter books are being opened by wiremakers but indications are supply conditions throughout the period will be about as tight as fourth quarter. Producers, however, expect that conditions in the market will be more orderly with CMP allotments more in balance with production.

Structural Shapes . . .

Structural Shape Prices, Page 153

Boston—Rollings to meet some fabricated structural steel projects will extend over three quarters, part of the tonnage to be rolled in each period. This tends to hamper fabricating shop schedules and an increasing volume of construction is behind schedule, including some highly rated work and bridges. Revalidation of considerable power plant and utility tonnage was late and fourth quarter was filled when mill space was sought.

New York—Structural demand continues spotty. Fabricators report scattered inquiries for industrial projects, bridge work and a few public jobs. Private work is at a virtual standstill, due to governmental restrictions.

Philadelphia—District mill operations continue at peak. Structural awards are confined largely at present to bridge work, with inquiries spotty. Most fabricators have enough steel on hand or in definite prospect to maintain high operations until early November, but are concerned as to supply of plain materials over the remaining weeks of the year.

Pittsburgh—NPA recommendations that certain design practices be used to conserve scarce materials will receive limited support from the construction industry. Any gains that could be made along these lines will not be appreciable. Design standards have not been made mandatory by NPA; if industry ignores recommendations, compliance likely will be forced.

Chicago—Shortage of structural shapes will force postponement of some building work. So far as can be determined, no steel expansions in this district will be adversely affected since projected work is well along toward completion. Some new open-hearth capacity is scheduled to come into operation in first quarter next year.

Warehouse . . .

Warehouse Prices, Page 159

Boston—Confronted with heavy demand which has reduced inventories to 30-35 per cent of normal, warehouses are turning down substantial orders, many from distant points. Only on hot-rolled strip bands are some distributors well stocked, being short of standard carbon products and alloys.

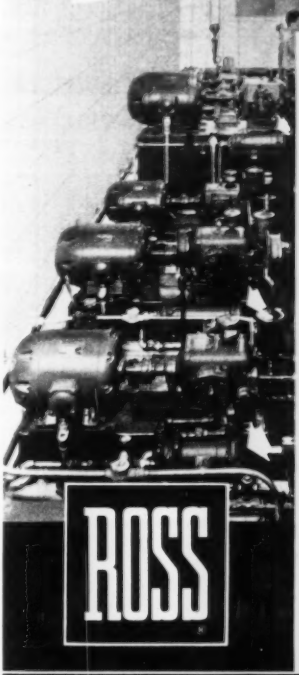
Pittsburgh — Walter S. Doxsey, president, American Steel Warehouse Association, predicts that 23 per cent less steel will be available for distributors under the closed-end CMP during the fourth quarter than average receipts for the first and second quarters this year. The small-lot purchaser will bear the burden of this decreased supply.

Cleveland—Warehouses are unable to accept all the business offered them because of highly unbalanced stocks. However, receipts from the mills are described as fair and hopes are high that something approaching inventory balance will be possible once the mills get back on the historic pattern of scheduling tonnage. So long as producers had to accept orders on a first-come first-served basis, it was inevitable that tonnage would be diverted from regular customers, including the warehouses.

Chicago—Demand pressure on the warehouses from civilian consumers is off, reflecting sluggish conditions

For overloaded, peak operations

OILGEAR controls heat with ROSS EXCHANGERS



Far removed from the plastic presses they serve, the Oilgear pumps illustrated (3 of the 8 pumps are shown) required long pipe lines that cause additional power loss and heat. This, combined with the heat required at each press, plus the need of maintaining a high static load over long periods, would push up oil temperatures beyond recommended limits — risking breakdown of vital oil properties and lost pump capacities. As a safeguard, the Oilgear Company equipped each of the eight pumps with Ross Type BCF Exchangers.

When pumps are to be operated continuously at peak capacity, overloaded during part of the cycle, with limited reservoir capacity, small surface for natural radiation or ambient temperature above normal, Oilgear furnishes a Ross Exchanger as a built-in component . . . a practice followed by the majority of hydraulic equipment manufacturers.

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RESISTANCE WELDING HOLDERS

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- Conductivity
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Summary

WW O.K. on all counts

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Send for this free booklet of latest information on Resistance Welding

in the home appliance and related trades. This is being offset by steadily rising demand for tonnage on defense account. Stocks are unbalanced and there is little prospect for any improvement in supply conditions before second quarter next year.

Seattle Outside of defense contracts, jobbers perceive some recession in business. Bulk of current turnover springs from government works.

Blast Furnace Sets Record

Bethlehem, Pa. Blast Furnace "H" at Bethlehem Steel Co.'s Sparrows Point Plant produced a record-breaking 55,835 tons in August.

Iron Ore . . .

Iron Ore Prices, Page 159

Cleveland — Continuing its steady march toward a record season, the Great Lakes fleet, as of Sept. 1, had carried over 100 million tons of ore, coal and grain, a feat achieved in only one previous year, 1944. This year's mark of 100,150,326 net tons compares with the 1944 figure of 101,683,842 tons, says Gerald S. Wellman, Lake Carriers' Association, this city.

Lake Superior iron ore shipments for the season to Sept. 10 aggregated 62,715,826 tons, the largest total for any like period since 1942 when the all-time ore record was set. This compares with 50,555,317 tons in the like period a year ago. Shipments for the latest week reported amounted to 2,864,038 tons against 2,766,036 tons for the week ended Sept. 10, 1950.

Pig Iron . . .

Pig Iron Prices, Page 152

New York Most district gray iron foundries are receiving a steady volume of light work and an increasing amount of heavier work, such as machine tool castings. Consequently, the overall rate of operation is higher.

Buffalo Pinch in merchant pig iron supplies was intensified by the shutdown of a top-producing unit.

Philadelphia Gray iron foundry operations are picking up moderately, increasing pressure for pig iron. One district merchant furnace has a little more iron available, but there are places for all of it and, in general, demand exceeds supply by as wide a margin as at any time in months. Some imported tonnage is coming in against old orders, but few new contracts are being placed abroad, partly because of heavy premiums being asked. A little foreign foundry iron is being offered at less than $80, duty paid.

Pittsburgh Iron production continues high. United States Steel Corp.'s Clairton No. 3 furnace will be in operation very shortly while resumption of operations on Crucible Steel Co.'s Midland furnace is set for Sept. 15. Pittsburgh Coke & Chemical Co., lone merchant producer, is operating its Neville Island stack above rated capacity of 800 tons

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a Knott Hotel

JOSEPH F. DUDDY, MANAGER

daily, but demand far exceeds supply.

Cleveland—Closing down of one stack here for repairs by American Steel & Wire Co. is reflected in further tightening in pig iron supplies in the district. Since merchant customers of this furnace were unable to materially add to their stocks over recent months they are forced to turn to other pig iron producers to care for their needs. So far the foundries have been able to get in enough iron to keep going.

Youngstown—Republic Steel Corp. has blown in its No. 3 blast furnace at the Youngstown Works, easing the plant's acute scrap and pig iron shortage. The furnace had been down for over a month for relining. Now all 25 of the furnaces in the Youngstown area are on the active list.

Chicago—Demand for merchant pig iron continues in excess of supply, though pressure from foundries is not as strong as it was some time back. This results from reduced operations at foundries normally engaged in producing castings for the civilian goods trade.

Seattle—Pig iron is tight and foundries are using larger tonnages of cast iron scrap. Domestic iron is practically unobtainable as producers are using output in their own steelmaking operations. Foreign pig is about $20 higher than domestic, due largely to increased ocean freights.

Scrap . . .

Scrap Prices, Page 160

New York—Supply of cast scrap is tightening. This material is still in freer supply than steelmaking scrap, but is in heavier demand than a few weeks ago. This is ascribed primarily to some of the higher operations in certain foundries engaged in the production of machine tool castings and components of other heavy equipment.

Buffalo—Mills continue to draw on reserve stocks as scrap still moves under allocations for two Valley points.

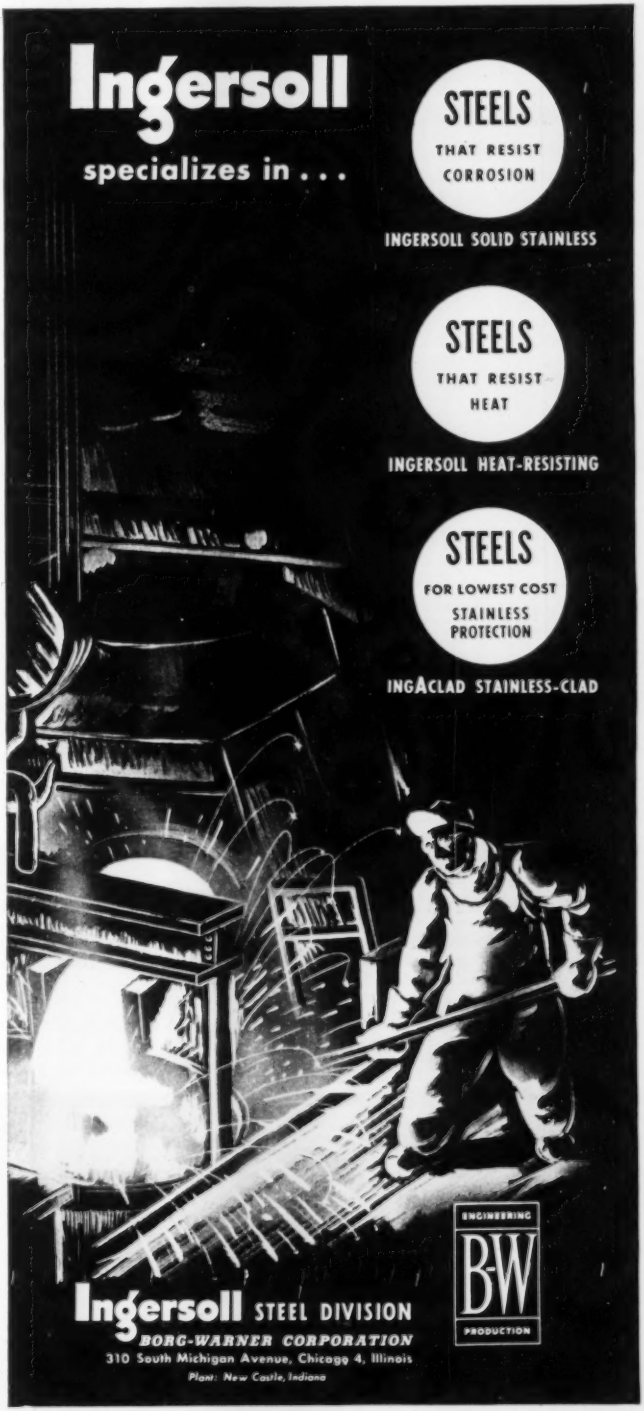
Philadelphia—While no new allocations are reported, steel scrap tonnage continues to move out of this district for midwest points. Some of this is against old allocations and some against upgraded orders. Meanwhile, district mills are losing ground.

Pittsburgh—Scrap inventory positions of consumers have been weakened and the situation is again critical. Peak steel production without adequate scrap receipts plagues all melters. Efforts of scrap salvage committees have resulted in additional movement, but great tonnages are required in view of the coming winter needs.

Detroit—Fairly encouraging reports were made by members of the local scrap mobilization committee regarding results of the drive so far. Accelerated scrapping of freight cars has resulted, and investigatory work is going on to determine whether much of the buried street car track in Detroit can be reclaimed. It was estimated that 16,000 tons of rail are buried on one street.

Cincinnati—Scrap dealer's stocks are low, giving no hope from this source for seasonal building of mill reserves.

Youngstown—Scrap shortage is



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acute here. Some steel plants have less than 10 days' supplies compared with a normal stock of two to three months' needs at this season.

Washington—Proper use of vessel rates in computing ceiling shipping point prices for steel scrap is clarified in interpretation 1 to CPR 5 by the Office of Price Stabilization. Under CPR 5 use of water rates is permissible where shipment by vessel was the established practice of shippers in a particular locality as of the effective date of the ceiling price regulation. However, regulations do not permit use of water rates to determine a shipping point price where, for reasons other than seasonal restrictions, it had become customary prior to Feb. 7, 1951, to ship by rail.

Sales of scrap in United States territories and possessions now is under specific dollars-and-cents ceiling price control as result of amendment No. 3 to OPS ceiling price regulation No. 5. Previous to Sept. 5 such scrap was priced under CPR No. 9.

Chicago—Scrap continues in strong demand. Pressure is greatest for steelmaking grades with mill inventories limited. So far, high level steelmaking operations are maintained. Some scrap has been allocated out of here to Ohio points.

St. Louis—An upsurge in allocations issued against scrap is diverting large supplies to Ohio mills. Brokers are having unusual difficulty filling their outstanding orders.

Birmingham—Steel mills are getting enough scrap to meet requirements, but are unable to accumulate inventories.

Los Angeles—Improvement in supply, coupled with a 50 per cent reduction in pipe foundries' requirements, has weakened the scrap market. Some foundries are so well stocked they are turning down dealers' offers.

Seattle—Steel scrap continues inadequate for requirements in this area. It is impossible to replenish inventories, receipts being used as quickly as they arrive. Bethlehem Pacific Coast Steel Corp. received 6500 tons of plantation scrap from Honolulu last week. The wrecked steamer *Andrea Luckenbach* was purchased by Marine Salvage Ltd., Hawaiian affiliate of Dulien Steel Products Inc., Seattle, and will be scrapped as she lies near Kauai Island. Several thousand tons are expected to be realized.

Rails, Cars . . .

Track Material Prices, Page 155

New York—Domestic freight car awards dropped to 1828 in August from 2417 in July and were the lightest since December, 1949, when 1220 units were placed, reports American Railway Car Institute and Association of American Railroads. August car deliveries were 7183 against 5290 in July. Order backlogs on Aug. 31 amounted to 139,014.

Tin Plate . . .

Tin Plate Prices, Page 154

Pittsburgh—Tin plate purchasers are allowed to present tentative allotments for first quarter 1952 on basis of 75 per cent of their fourth quarter allotment. Second and third quarters fall in line at 60 and 50 per cent, respectively. Some producers are reluctant to accept anything beyond first quarter. Tin plate supplies are ample.

Electrolytic tinning capacity for the years 1948-50, inclusive, increased 49 per cent, or considerably faster than production.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1500 tons, county bridge, Lehigh county, Pennsylvania, to Bethlehem Steel Co.

1065 tons, state bridges, Fall River expressway, Fall River-Freetown, Mass., to Bethlehem Steel Co.; M. DeMatteo Construction Co., Quincy, Mass., general contractor.

930 tons, state bridgework, York and Cumberland counties, Pennsylvania, to Bethlehem Steel Co.

800 tons, Mores Creek bridge, Boise county, Idaho, U. S. Engineer relocation project, to unstated interest; Roy L. Bair & Co., Spo-

STANDS 50,000 LB. LOADS 60 seconds after application

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kane, general contractor; previously reported as 80 tons.

470 tons, Army hangar Eielson field, Alaska, to Pacific Car & Foundry Co., Seattle, balance government-furnished; previously reported 200 tons; Peter Kiewit Sons Co., Seattle, general contractor.

142 tons, state bridge, Berks county, Pennsylvania, to Bethlehem Steel Co.

Unstated, spillway gates and appurtenances, McNary dam, to Gunderson Bros. Engineering Corp., Portland, Oreg., low $1,566,334, by U. S. Engineer, Portland.

STRUCTURAL STEEL PENDING

800 tons, addition to New York state hospital, Willard, N. Y.; bids asked.

750 tons, engineering wing, Grumman Aviation Corp., Bethpage, Long Island, N. Y.; bids asked.

500 tons, Brooklyn-Queens connecting highway, New York; bids to be closed Sept. 17 by Office of the President, Borough of Brooklyn.

462 tons, three state bridges, Sussex county, Delaware; bids Sept. 26.

375 tons, assembly building, Reed-Prentice Corp., Worcester, Mass.; E. J. Cross Co., Worcester, general contractor.

200 tons, plant addition, Hyatt Bearings Division, General Motors Corp., Harrison, N. J.; bids closed.

150 tons, public school No. 255, Brooklyn, N. Y.; pending; reinforcing bars also required.

Unstated, steel bridge and 600-foot coal handling conveyor, Chena river, Fairbanks, Alaska; S. S. Mullen, Seattle, low $520,500.

REINFORCING BARS . . .

REINFORCING BARS PLACED

615 tons, Corps of Engineers, San Francisco, to Bethlehem Pacific Coast Steel Corp., that city.

245 tons state bridges, Leominster, Mass., to Truscon Steel Co., Boston; Bayer & Mingolla Construction Co., Worcester, general contractor.

REINFORCING BARS PENDING

714 tons, laterals West canal, Columbia Basin project, four schedules; bids to Bureau of Reclamation, Ephrata, Wash., Sept. 20.

PLATES . . .

PLATES PLACED

Unstated, completion of Detroit dam, Oregon, to American Pipe & Construction Co., Portland, Oreg., by Consolidated Builders, general contractors.

Unstated tonnage, elevated steel water tank, Newton, Mass., to Chicago Bridge & Iron Co., Chicago, $52,800; also replacement, three water tanks, naval station, Newport, R. I., same fabricator, $16,600.

PIPE . . .

CAST IRON PIPE PENDING

100 tons, cast iron pipe, government project, Richland, Wash.; award pending.

RAILS, CARS . . .

LOCOMOTIVES PLACED

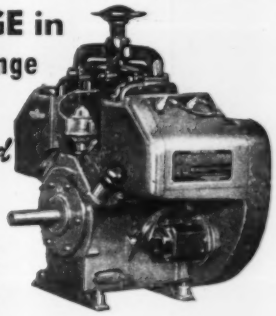
Boston & Maine, 39 diesel-electric locomotive units; eleven 1600-hp road switching and twelve 660-hp switching units, to American Locomotive - General Electric Companies, Schenectady, N. Y.; seven 1200-hp switching and nine 1500-hp road switching units to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Seaboard Air Line Railway, 25 diesel-electric locomotives including fifteen 1500-hp road freight locomotives and ten 1600-hp locomotives, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Seaboard Air Line Railway, 1000 freight cars, including 400 seventy-ton cement cars, 300 fifty-ton high-side gondolas, and 300 fifty-ton low-side gondolas, to Pullman-Standard Car Mfg. Co., Chicago. Pullman will build the cement cars at Butler, Pa., and the gondolas at Bessemer, Ala.

POWER ADVANTAGE in the Top Bracket Power Range . . . V-Type 4-Cylinder WISCONSIN *Air-Cooled* ENGINES, 15 to 30 hp.



These 4-cylinder, V-type Wisconsin Engines meet every heavy-duty power requirement. V-type design assures not only the smoothest power delivery but also represents substantial reductions in engine weight as well as extreme compactness . . . at no sacrifice of rugged construction.

CONDENSED SPECIFICATIONS

MODELS		VE4	VF4	VP4D
Bore	inches	3	3 1/4	3 1/2
Stroke	inches	3 1/4	3 1/4	4
Displ. cubic inches		91.9	107.7	154
H.P. and R.P.M. range		15 at	17.5 at	26.8 at
		1600	1600	1600
		21.5 at	25 at	31 at
		2400	2400	2200
Net weight in lbs., Standard Engine		295	295	410

Our engineering department will gladly cooperate with you in adapting Wisconsin Engines to your requirements. Write for detailed data and the name of the nearest Wisconsin distributor.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
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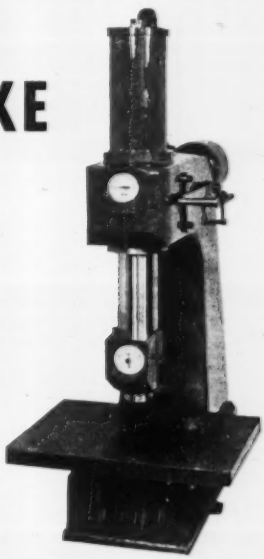
A BETTER LONG STROKE BRINELL



For you folk who test large or awkward parts, singly or on a production basis. The long stroke makes screw adjustment to work size unnecessary.
Large table eliminates extra help in handling. Table remains at a constant level and machine may be readily inserted in your conveyor line.
Straight Roller or Vee Roller table may be substituted for flat table shown.

FAST • ACCURATE • SAFE

Available either direct reading, as shown, or as a plain Brinell in a size to accommodate your work. Motor to suit your current characteristics. Other types of standard machines also, in stock. Special machines built to requirements.

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Widely used in Dies for breaking oil seals. Because these complete units are more easily removed than "home-made" spring plungers, disassembly of Dies for maintenance is simplified and effects savings up to $72.00 per Die. Another popular use is for positioning work pieces. They are also ideal for many end product applications. Each unit is precision-built for trouble-free operation. Available in ten sizes with end pressures of 3 to 42 lbs.

SPRING STOPS

Designed to position work pieces quickly or for any other use where a spring holding tension of 14 or 32 lbs. is desired. Each unit is made with a cast iron body with a hardened steel plunger having a radiused nose. Body has jig bored holes for precision mounting. These tough units are built to give years of money-saving service.

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Vlier multi-dimensional fixture keys are counter-bored hex nuts with accurately milled stepped sides whose different cross dimensions are held to a tolerance of ± .0005". By attaching to a fixture base, rotating the key to the desired side dimension and sliding into the mill table slot, set-up time is virtually eliminated—any idle machine can be quickly put to work. Available in seven sizes, each with three different dimensions; or made up to your order.

Machine Tool Specialties

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ALCOA *Aluminum* CASTINGS

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LORD BALTIMORE HOTEL

BALTIMORE, MARYLAND

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Pittsburgh Gives Contract

Pittsburgh Steel Co., Pittsburgh, awarded to Ragnar Benson Inc., that city, the general contract for erection of the company's new 66-inch hot sheet and strip mill at its Allenport, Pa., plant. This is part of the fourth step in the company's long-range expansion program, which will result in a 50 per cent increase in capacity and further diversification of products. The new strip mill, being built by United Engineering & Foundry Co., Pittsburgh, will have an estimated capacity of 900,000 tons a year.

Completion of the strip mill is expected by July, 1952, and will mark the first participation by Pittsburgh Steel Co. in the market for sheets. The company's expansion program at Monessen is well under way. The new 66-inch high lift blooming-slabbing mill will be ready for operation in November.

New Shop for Nordberg Mfg.

Nordberg Mfg. Co., Milwaukee, plans to build a welding shop to cost $750,000. It will be located at the southwest corner of S. Chase avenue and E. Dewey place.

Diehl Boosts Lathe Output

G. M. Diehl Machine Works Inc., Wabash, Ind., expanded its Machine Tool Division and is now producing its No. 2 turret lathe in quantity.

Smith Corp. Gets NPA Okay

A certificate of necessity was issued by National Production Authority to A. O. Smith Corp., Milwaukee, for 75 per cent of $182,593 to be used in providing facilities for making heat exchanger parts.

Gisholt Moves Office

Office of the representatives of Gisholt Machine Co., Madison, Wis., in Cleveland has been moved to 14812 Detroit Ave. The representatives are Ralph Miller Jr. and Bill Clark.

Hyatt Bearings Adds Space

Hyatt Bearings Division, General Motors Corp., Harrison, N. J., plans to expand the manufacturing areas in its plants in Harrison and Clark township, New Jersey. New structures at the latter plant will provide an additional 390,000 square feet of floor space, doubling existing facilities. Alterations to the Harrison plant will provide an additional 12,000 square feet of manufacturing area. It is estimated ten months will be required to complete the project. Start of actual construction depends upon availability of materials.

Niles Rolling Mill Improved

Niles Rolling Mill Co., subsidiary of Sharon Steel Corp., Sharon, Pa., will proceed immediately with the construction of a one-bay extension of its galvanizing building, a two-story store, laboratory and engineering building, and a machine shop. Total cost of these improvements, including $121,000 for machine tools, is estimated at $335,365.

New U.S. Radiator Heaters

United States Radiator Corp., Detroit, developed three new models of automatic heating units that burn either coal, gas or oil. They are designed to protect home owners against shortages of any particular fuel, since they can be converted from one fuel to another.

Will Make Aircraft Parts

National Tapered Wings Inc. was organized to manufacture aircraft parts at 3218 Union Pacific Ave., Los Angeles.

Research Wins Contract

Research Corp., New York, was awarded contracts by Wilputte Coke Oven Division, Allied Chemical & Dye Corp., New York, and Arthur G. McKee & Co., Cleveland, to cover installation of eight electrostatic precipitators at the Fairless Works, Morrisville, Pa.

Mid-Continent Alterates

Mid-Continent Spring Co., University City, Mo., will build an addition to its plant, also alter its present building.

Seeks New Pickling Methods

Marsam Corp., Pittsburgh, will conduct statistical studies on pickling of bessemer sheet steel in an attempt to develop superior practices than those presently used in the industry. Studies should point the direction for further research and show weaknesses in present practices, Marshall Wagman, president, announced.

Marsam recently acquired the forging shop building formerly used by Pressed Steel Car Co. in McKees Rocks, Pa. Floor space amounts to 70,000 sq ft, all

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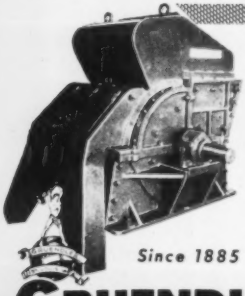

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under crane facilities. Plant has a potential handling of 20,000 tons per month and can pickle, slit or shear coils from 1 inch up to 48 inch widths in 10 to 20 gages. Approximate cost of the installation is $250,000. W. C. Ackerman, formerly assistant superintendent of sheet pickling plant at Jones & Laughlin Steel Corp.'s Pittsburgh Works, has been appointed general superintendent of Marsam.

Jersey Shore Steel Bought

J. E. Eckel has disposed of his interest in Jersey Shore Steel Co. Inc., Jersey Shore, Pa. Mr. Eckel's interest was purchased by John A. Schultz and Charles M. Schultz, Williamsport, Pa., who will operate the company at its present location with no change in management.

W. L. Maxson Corp. Moves

W. L. Maxson Corp. will start moving machinery and equipment into its new 100,000 square foot plant at Old Forge, Pa., Sept. 4, and will begin production on defense contracts about Sept. 15. E. L. Spray is vice president and general manager of the company.

New Firm Produces Rockets

Hycon Mfg. Co., and Oedekerk & Ludwig Co., both of Pasadena, Calif., pooled their resources, manpower, and production facilities under the joint venture law. Navy contracts of several million dollars were received by Hycon-Oedekerk Co. for production of rockets.

Forms Used Machinery Unit

Products Engineering Co., East Orange, N. J., organized a Machinery Rebuilding Division under the direction of Martin Kaufman. At present, the company is rebuilding machinery for the Air Force pool.

Armco Purchases Quarries

Armco Steel Corp., Middletown, O., purchased all the outstanding stock of two companies which own and operate limestone quarries at Piqua, O. The two companies are Ohio Marble Co., the operating concern, and Piqua Stone Products Inc., a selling organization. The companies are the principal source of limestone for the two blast furnaces Armco operates at its Hamilton, O., plant. About 25 million tons of limestone are available on the property. Armco's combined needs for limestone at Hamilton and Middletown will be about 400,000 tons per year when the $35 million blast furnace and coke oven plant in Middletown is completed late next year. The quarries at Piqua will produce that amount of blast furnace limestone each year, in addition to about 200,000 tons of related products which will continue to be sold to other industries. Lawrence Townsend will continue as manager of the properties.

Opens Subassembly Plant

Lockheed Aircraft Corp., Burbank, Calif., opened a subassembly plant in Bakersfield, Calif. for production of airplane parts.

Awards $35 Million Contract

A joint venture comprised of Adrian Wilson, Los Angeles, and J. Gordon Turnbull Inc., Cleveland, have been awarded an architectural-engineering contract for $35 million expansion and rehabilitation of 22 U. S. Air Force bases for the Far Eastern Air Force. The organization has recruited American personnel for transportation to Japan and will establish offices there.

Will Build Steel Bleachers

Seating Inc. was organized by Kermit H. Wilson and Henry P. Albrecht, Minneapolis, for production of portable steel bleachers. These men also are officers of the Wilson-Albrecht Co. Inc., manufacturer of sectional steel scaffolding equipment. Seating Inc. will use Wilson-Albrecht plant facilities at 3565 Wooddale Ave., St. Louis Park, Minn. The company will enlarge its line to include production of portable table and bench service for schools and public buildings when patents have been granted.

Gets Additional War Work

Norris-Thermador Corp., Los Angeles, was awarded government contracts totaling $15 million for production of ammunition components. Government business backlog as of July 31 was $50.5 million excluding facility contracts for procurement and installation of facilities at Louisville and Riverbank, Calif.

Company's defense work—60 per cent of overall production—includes contracts for rocket containers, rocket heads, bomb fins, and cartridge cases.

Testing Grows at National

A new physical testing laboratory for railway engineering development work will be built by National Malleable & Steel Castings Co., Cleveland, on a site adjacent to its Cleveland Works. The company's established research on car couplers will be continued and expanded with the new facilities. Among other railroad equipment items which

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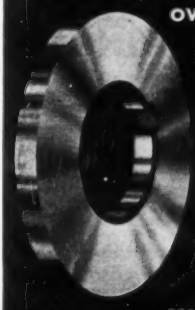

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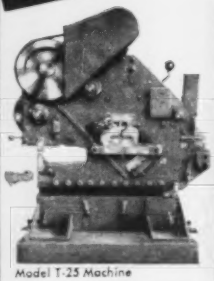

Model T-25 Machine

— SPECIFICATIONS —

	Model T-15	Model T-25
to Punch	7/8" x 7/16"	1" x 9/16"
to Shear		
Plates	7/16"	1/2"
Flat Bars	3" x 9/16"	3-3/16" x 5/8"
Tees	3-1/8" x 5/16"	4" x 3/8"
Angles	3-1/8" x 5/16"	4" x 3/8"
Round Bars	1-3/16"	1-3/8"
Square Bars	1"	1-1/4"

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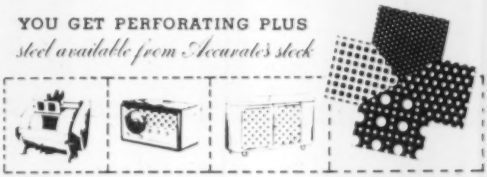

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will be studied, tested and developed at the laboratory are draft gears for freight and passenger cars and motive power equipment, freight car trucks, journal boxes and journal box lids, as well as similar devices for the mine and industrial fields. Kenneth L. Selby, chief engineer, Railway Division, will direct activities of the laboratory.

Benchmaster Mfg. Co. Builds

Benchmaster Mfg. Co., Los Angeles, is constructing a building at 1831 W. Rosecrans Blvd., that city, for production of punch presses, milling machines and accessories. Completion is scheduled for November.

Kelley-Koett Augments Line

Kelley-Koett Mfg. Co., Cincinnati, a subsidiary of Tracerlab Inc., Boston, was appointed distributor of the high-voltage X-ray equipment produced by High Voltage Engineering Corp., Cambridge, Mass.

Will Make Tank Torsion Bars

United States Spring & Bumper Co., 4951 Alcea Ave., Los Angeles, Calif., is adding $1,350,000 of plant facilities for manufacture of tank torsion bars.

Buchanan Moves to Hillside

Buchanan Electrical Products Corp. moved its entire facilities to a new plant at 225 Highway 29, Hillside, N. J. The company makes solderless connectors, conduit bushings, terminal blocks and other electrical fitting specialties.

Johnston Pump Builds Plant

Johnston Pump Co., Vernon, Calif., started construction of a $2 million plant at 3272 E. Foothill Blvd., Pasadena, Calif. Operations at the Vernon plant will be moved to the new plant on its completion.

Advance Tool & Die To Move

Advance Tool & Die, Los Angeles, will move from 1515 E. Olympic Blvd. to 3445 Union Pacific Ave. in October. The move will increase facilities for manufacture of tools, dies, jigs, aircraft parts and Army ordnance equipment.

McCulloch Buys Rhodes Lewis

McCulloch Motors Corp., Los Angeles, purchased all outstanding stock of Rhodes Lewis Co., Culver City, Calif., manufacturer of aircraft components.

Existing contracts between Rhodes Lewis and the Army, Navy, and major airframe manufacturers, totaling more than $6 million, will remain in force, and will be fulfilled under the new management and ownership.

Safway Builds in Indiana

A plant for the manufacture of scaffolding for construction work and for bleachers will be erected in Rochester, Ind., by Safway Steel Products Inc., Milwaukee. Part of the work at the new plant, costing between $200,000 and $250,000, will be on government orders.

Opens California Pipe Plant

Pacific Fittings Division, General Metals Corp., opened a plant at 12024 Center St., Hollydale, Calif., to manufacture malleable pipe fittings, pipe nipples, industrial pipe and pipe couplings.

Loewy Appoints Distributors

Loewy Construction Co. Inc., New York, appointed D & P Engineering Co., 11370 W. Olympic Blvd., Los Angeles, exclusive representative for the sale of Marform presses and Marform package units in California. N. Nelson Leonard is president of the Los Angeles firm. Loewy also appointed J. R. Allen Co., Cleveland, as representative for sale of counter-blow forging hammers, Marform presses and Marform package units in Ohio.

Opens Aircraft Parts Plant

H. I. M. Aircraft Parts, La Crescenta, Calif., opened a plant to manufacture aircraft parts at 3651 Foothill Blvd., that city.

Schwien Makes Gyroscopes

Schwien Engineering Co., Los Angeles, was granted a Defense Production Administration loan for a plant to manufacture gyroscopic flight instruments. Completion is scheduled by January, 1952.

New Plant for Bruce

Bruce Engineering Co., Los Angeles, is constructing a plant at 1633 W. 134th St., Gardena, Calif., to manufacture aircraft parts. Completion is scheduled for November.

Operadio Changes Name

Operadio Mfg. Co., St. Charles, Ill., changed its name to Dukane Corp., manufacturer of intercommunicating equipment, paging and sound equipment, sound slidefilm projectors, and magnetic tape recorders. The company is extensively engaged in the production of highly specialized electronic defense material and has been at work on government contracts almost continuously since 1939.

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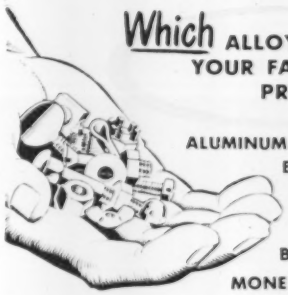

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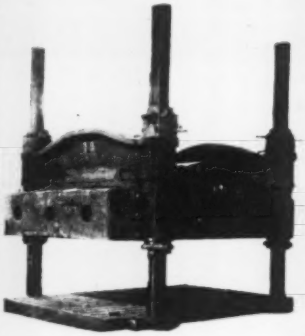

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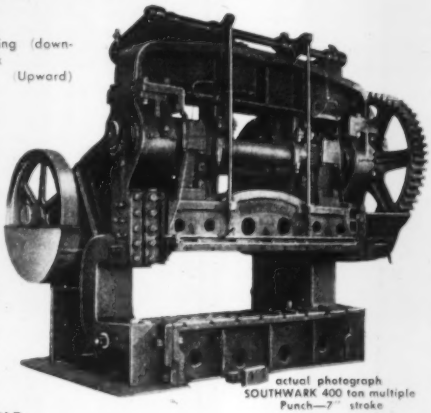

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with tools for Izod and Charpy tests
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Lincoln generator, Chrysler engine
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27-32"	Rd. 10-12'	52100	700
HOT ROLLED BARS			
1-3-16"	Rd. 10-12'	52100	7000 #
3½"	Rd. 10-12'	52100	3400
3¼"	Rd. 10-12'	4320	1500
5"	Rd. 10-12'	4320	1100
CORE RODS			
5-16" Rd.	H.R.	14' Len.	25000 #
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Cabooses, Eight Wheel, Cupola Type
Flats, 50-Ton, Steel Underframe, 40'0"
Gondolas, Composite or All Steel, 50-Ton and 70-Ton
Hoppers, Covered, All-Steel, 50-Ton & 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Hoppers, All-Steel, 70-Ton, Cross Dump
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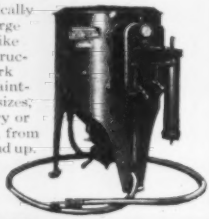

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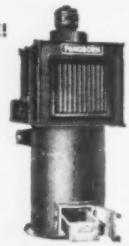

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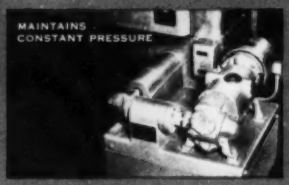

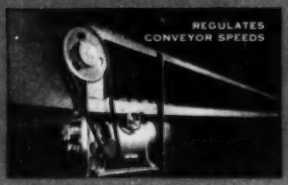

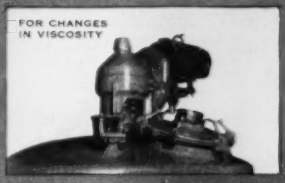

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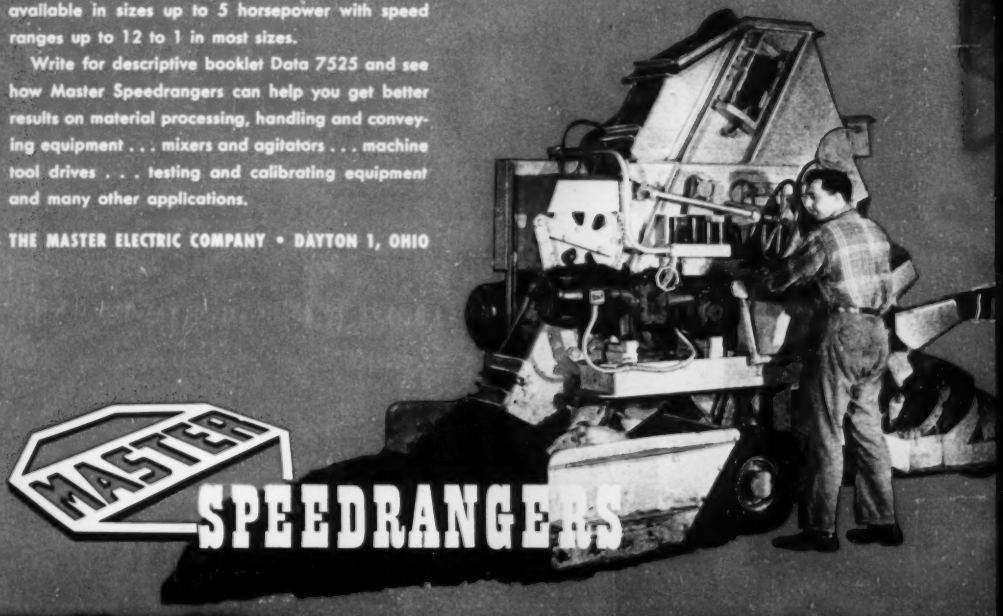

Hot and cold, back and forth, Ford rolls steel on TIMKEN® bearings

SHOWN here at the Rouge plant, Ford Motor Company, are a 66" hot strip mill, a 3-stand 66" cold tandem mill, and a single stand cold reversing mill —all in operation since 1935. And a total of 96 Timken® roll neck bearings on their work rolls and back-up rolls help keep the mills rolling, day in and day out, with minimum time-out for lubrication and maintenance.

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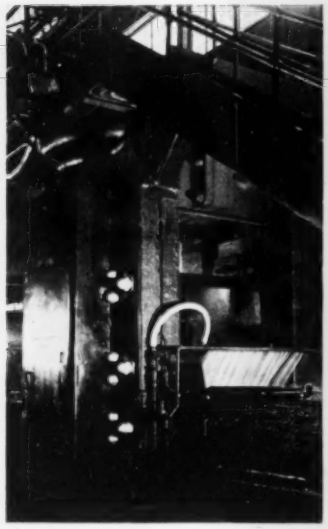
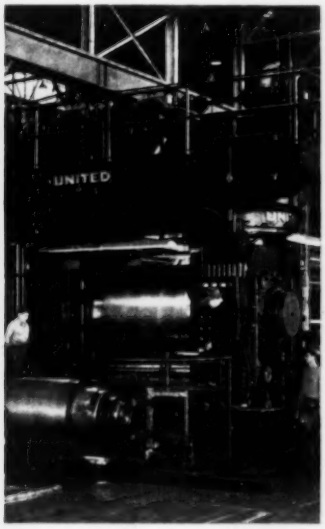
This symbol on a product means its bearings are the best.

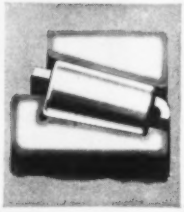


66" hot strip mill

3-stand 66" cold tandem mill



1-stand cold reversing mill



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